

Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report									
RSY Pad: RSY 30 Use 1					Soil Origin: TU153A ESU				
Data attached and submitted by: Amy Mangel					Data Report Submittal Date: 02/12/2021				

Systematic Soil Sample Data: RSY 30 Use 1									
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)	²³⁵ U Final Analytical Results (pCi/g)	²³⁹ Pu Final Analytical Results (pCi/g)
Project Remediation Goals*					1.861	0.141	0.331	0.195	2.59
HPPG-ESU-TU153A-001	1	Systematic	9,425	15,658	0.213	0.0003	-0.0759	0.0148	0.000
HPPG-ESU-TU153A-002	2	Systematic	10,005	15,658	0.314	0.0226	0.00986	N/A	N/A
HPPG-ESU-TU153A-003	3	Systematic	9,604	15,658	0.282	0.0266	0.0469	N/A	N/A
HPPG-ESU-TU153A-004	4	Systematic	10,069	15,658	0.274	-0.0266	-0.0351	N/A	N/A
HPPG-ESU-TU153A-005	5	Systematic	10,366	15,658	0.337	0.0264	0.0565	N/A	N/A
HPPG-ESU-TU153A-006	6	Systematic	10,165	15,658	0.208	0.00154	-0.0479	N/A	N/A
HPPG-ESU-TU153A-007	7	Systematic	10,005	15,658	0.327	-0.0767	0.0297	N/A	N/A
HPPG-ESU-TU153A-008	8	Systematic	9,895	15,658	0.282	-0.0167	-0.0230	N/A	N/A
HPPG-ESU-TU153A-009	9	Systematic	9,784	15,658	0.0165	0.0137	0.0251	N/A	N/A
HPPG-ESU-TU153A-010	10	Systematic	9,909	15,658	0.280	-0.0116	0.0414	N/A	N/A
HPPG-ESU-TU153A-011	11	Systematic	9,954	15,658	-0.131	0.0022	0.0150	0.0120	0.000
HPPG-ESU-TU153A-012	12	Systematic	9,994	15,658	0.246	0.0163	0.00997	N/A	N/A
HPPG-ESU-TU153A-013	13	Systematic	9,677	15,658	0.237	-0.0490	0.0266	N/A	N/A
HPPG-ESU-TU153A-014	14	Systematic	10,138	15,658	0.239	0.0217	0.0220	N/A	N/A
HPPG-ESU-TU153A-015	15	Systematic	9,179	15,658	0.290	-0.00238	0.0857	N/A	N/A
HPPG-ESU-TU153A-016	16	Systematic	9,755	15,658	0.181	0.000	0.0368	N/A	N/A
HPPG-ESU-TU153A-017	17	Systematic	9,927	15,658	0.292	0.0124	-0.0324	N/A	N/A
HPPG-ESU-TU153A-018	18	Systematic	10,103	15,658	0.295	0.0237	0.0896	N/A	N/A
HPPG-ESU-TU153A-019	19	Systematic	9,421	15,658	0.186	-0.0186	-0.0246	N/A	N/A
HPPG-ESU-TU153A-020	20	Systematic	9,520	15,658	0.201	0.00679	-0.00862	N/A	N/A
HPPG-ESU-TU153A-021	21	Systematic	9,686	15,658	0.319	0.0397	-0.00943	0.0163	-0.0225
HPPG-ESU-TU153A-022	22	Systematic	9,340	15,658	0.260	0.0529	0.0457	N/A	N/A
HPPG-ESU-TU153A-023	23	Systematic	9,454	15,658	0.195	0.0120	0.0505	N/A	N/A
HPPG-ESU-TU153A-024	24	Systematic	9,534	15,658	0.256	-0.0380	-0.00756	N/A	N/A
HPPG-ESU-TU153A-025	25	Systematic	9,717	15,658	0.105	-0.0164	-0.0213	N/A	N/A
Soil Systematic Sample Statistics					²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)	²³⁵ U Final Analytical Results (pCi/g)	²³⁹ Pu Final Analytical Results (pCi/g)
Maximum					0.337	0.0529	0.0896	0.0163	0.000
Mean					0.2282	0.0009	0.0122	0.01437	0.00750
Median					0.256	0.0022	0.0150	0.0148	0.000
Minimum					-0.131	-0.0767	-0.0759	0.0120	-0.0225
Standard Deviation					0.1037	0.0286	0.0408	N/A	N/A

Biased Soil Sample Data: RSY 30 Use 1									
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)	²³⁵ U Final Analytical Results (pCi/g)	²³⁹ Pu Final Analytical Results (pCi/g)
Project Remediation Goals*					1.861	0.141	0.331	0.195	2.59
HPPG-ESU-TU153A-B-001	1	Biased	9,928	15,658	0.400	-0.0512	0.0591	0.00745	-0.00771

CPM Counts per minute

pCi/g Picocuries per gram

* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-09302020-PG-ROV-133	09/30/2020	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-10012020-PG-JSS-136	10/01/2020	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-10012020-PG-JSS-135	10/01/2020	3x3	08/06/2021	108853
Biased Sample Survey	HPRS-10022020-PG-JSS-140	10/02/2020	3x3	08/06/2021	108853

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 30 Use 1
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 48 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
2) One-minute static follow-up measurements with the RS-700 were collected at 48 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-61. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 62-121). The systematic soil samples were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 62-121). Samples HPPG-F-003 and HPPG-F-004 are field duplicates, correlating to systematic samples -008 and -022. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project. As a result of a COC generation error, APTIM erroneously requested Total Strontium analyses for 100% of the systematic samples, instead of the required 10%. All Strontium data received is reported. The alpha spectroscopy analyses for Uranium-235 and Plutonium-239 were requested after the samples and COC had been shipped to the lab (pages 152-153), which is why those analyses are not marked on the COCs. The Instrument and Survey Summary table above lists the 3x3 NaI detector used for the gamma static measurements collected during sampling activities, and the instrument-specific gamma static IL listed in the sample tables on page one is developed from that instrument's RBA data.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1 and 3.4.1, one biased sample was collected since all follow-up static measurements were below the ROC-specific critical levels. The biased sample was collected from the location of the highest gross gamma scan measurement. TestAmerica sample results are attached (pages 122-151). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
Conclusions: In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background. RSY 30 Use 1 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-153A ESU. APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-153.

Soil Scan Statistics

Statistical Summary

Dataset		PG-RSY-30-U1				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		3.01	29.06	11.62	11.03	3.42
ROI-06		46.10	114.20	78.90	79.14	9.35
ROI-07		35.08	90.20	61.49	61.13	8.24
ROI-08		65.13	150.30	99.93	100.20	10.86
ROI-10		1,805.20	2,421.02	2,095.63	2,094.68	80.47

Statistical Summary Reference Background

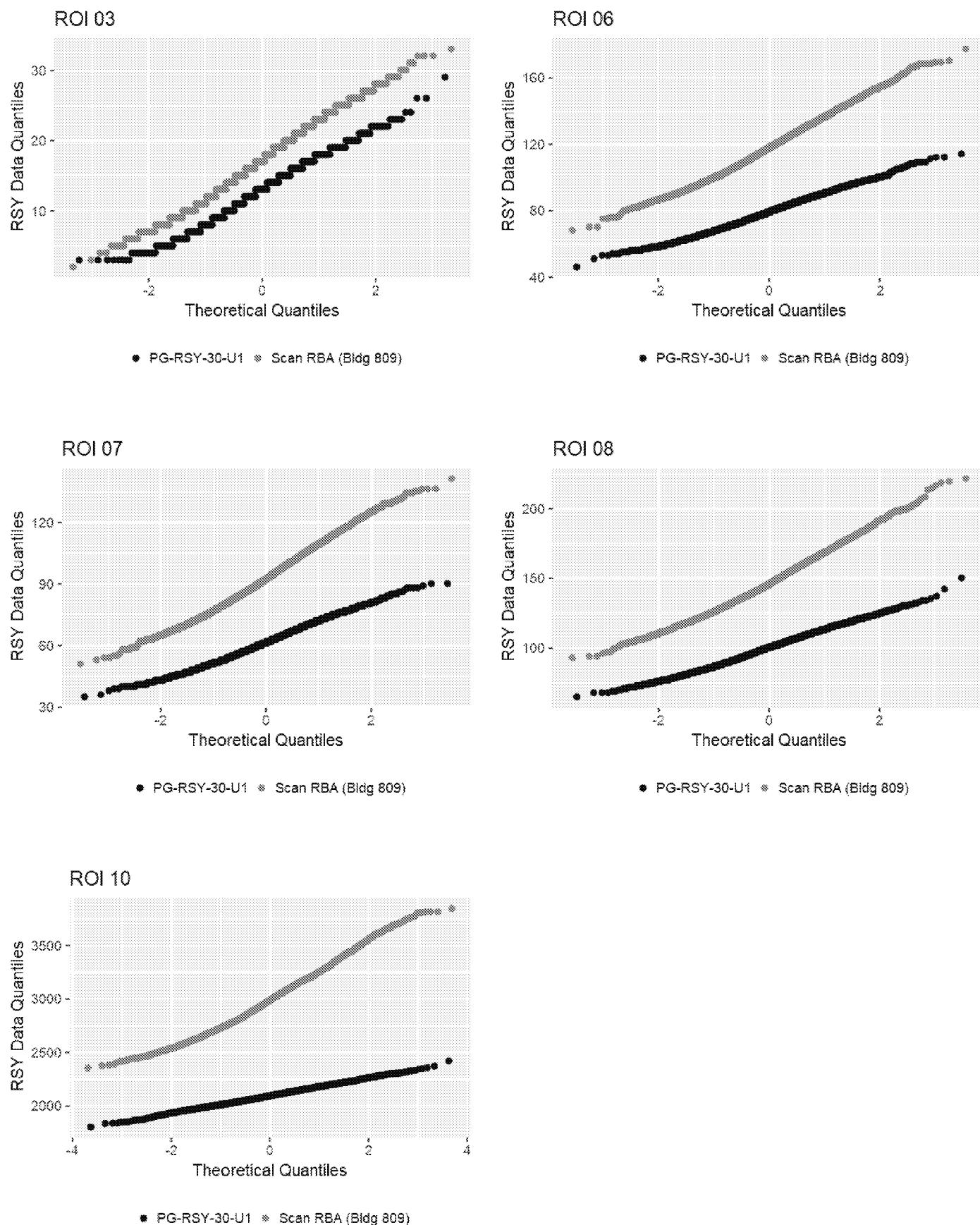
TYPE		Scan RBA (Bldg 809)				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	33.08	16.21	16.04	4.13
ROI-06		68.15	177.45	117.58	117.26	15.50
ROI-07		51.11	141.33	92.34	91.24	13.43
ROI-08		93.19	221.48	146.24	145.30	18.21
ROI-10		2,354.11	3,845.31	2,995.57	2,989.64	255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-30-U1	3978
Scan RBA (Bldg 809)	4632

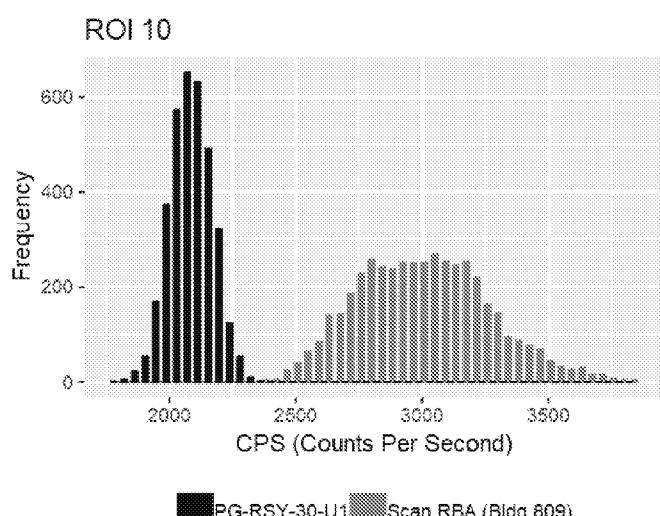
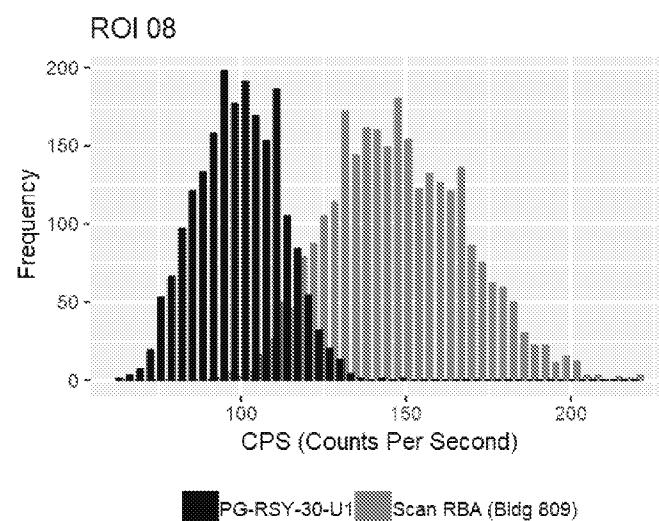
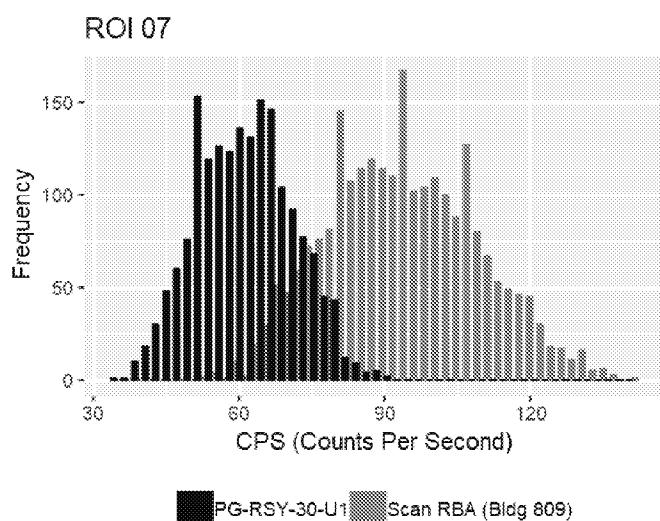
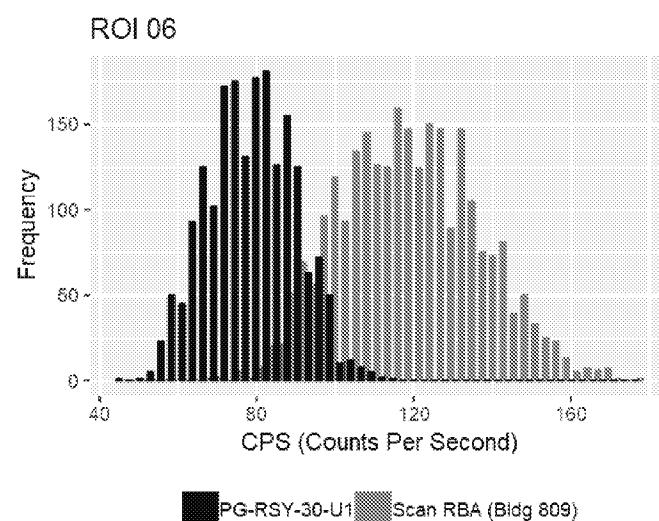
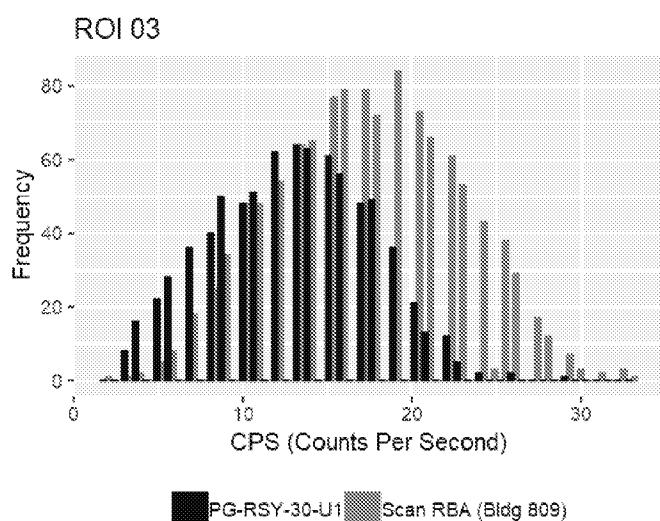
Soil Scan Statistics

Normal Q-Q Plots



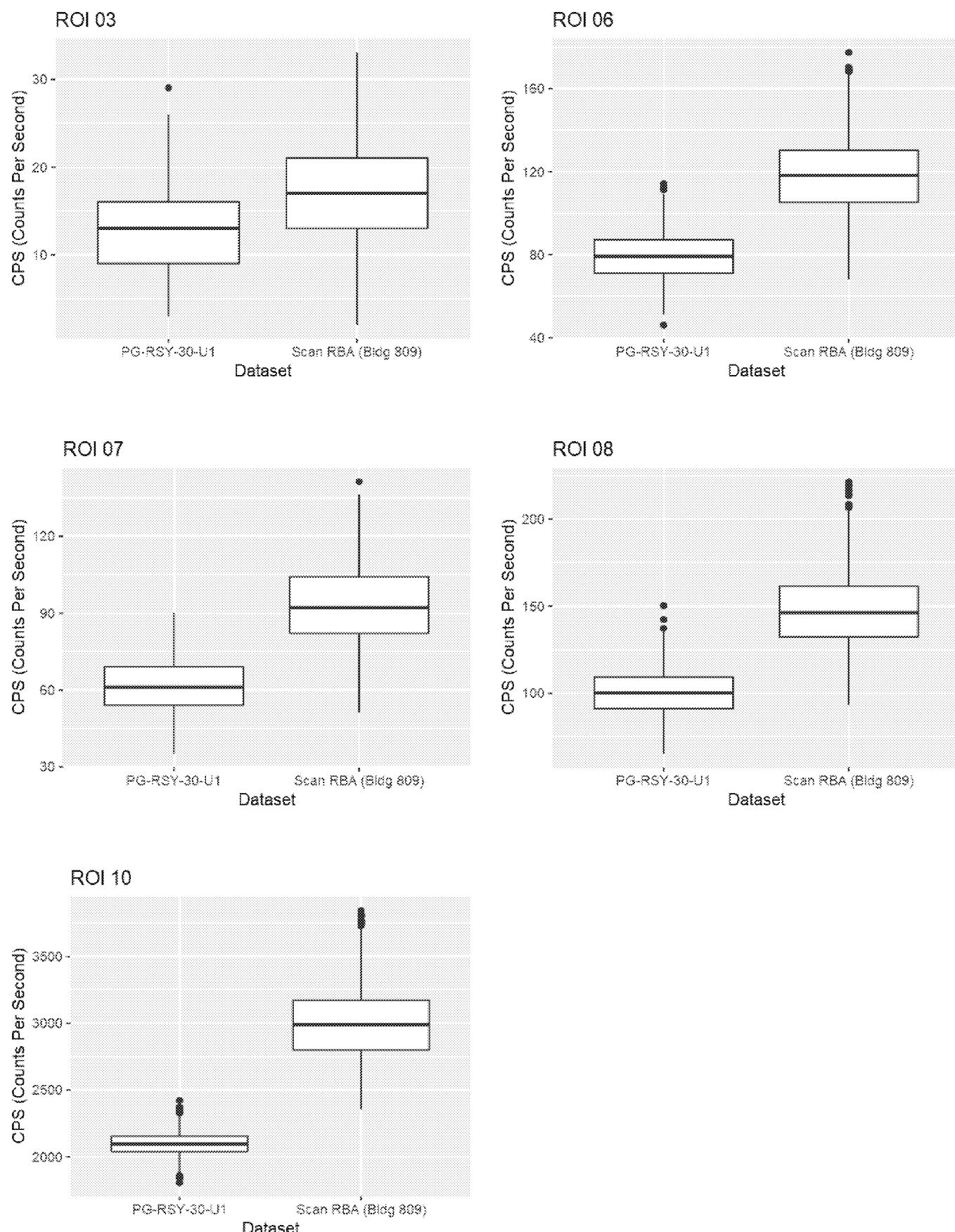
Soil Scan Statistics

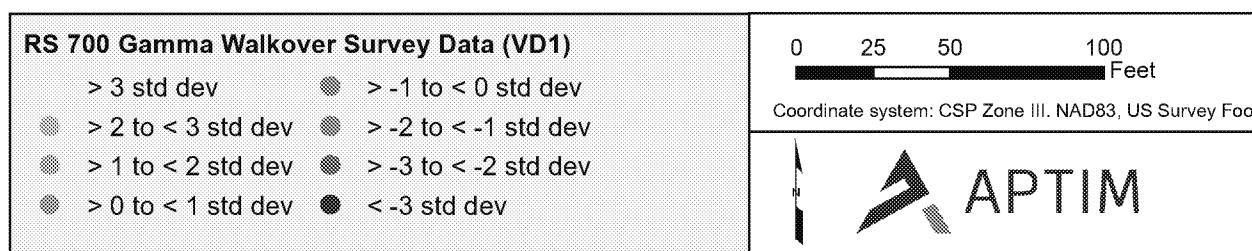
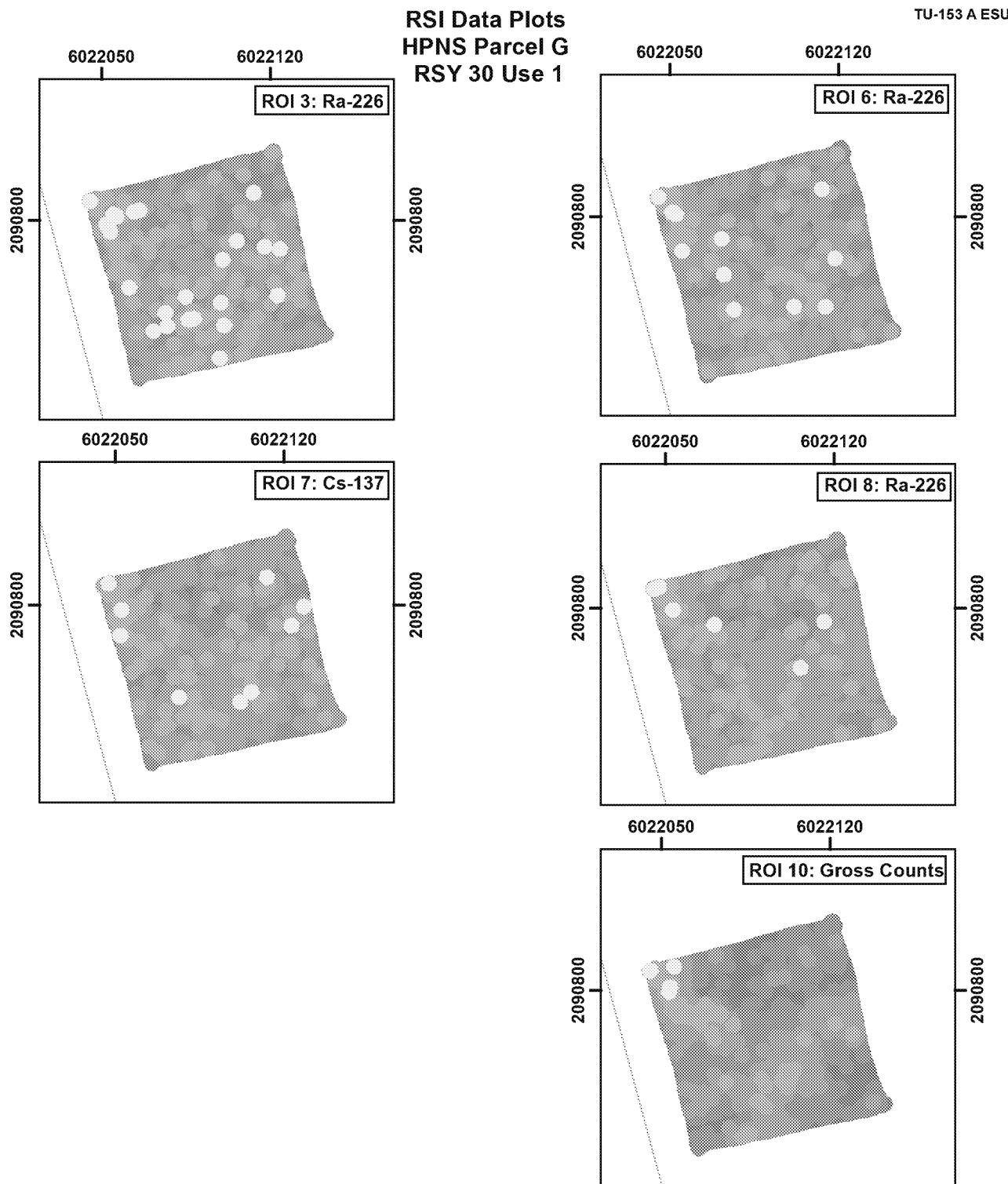
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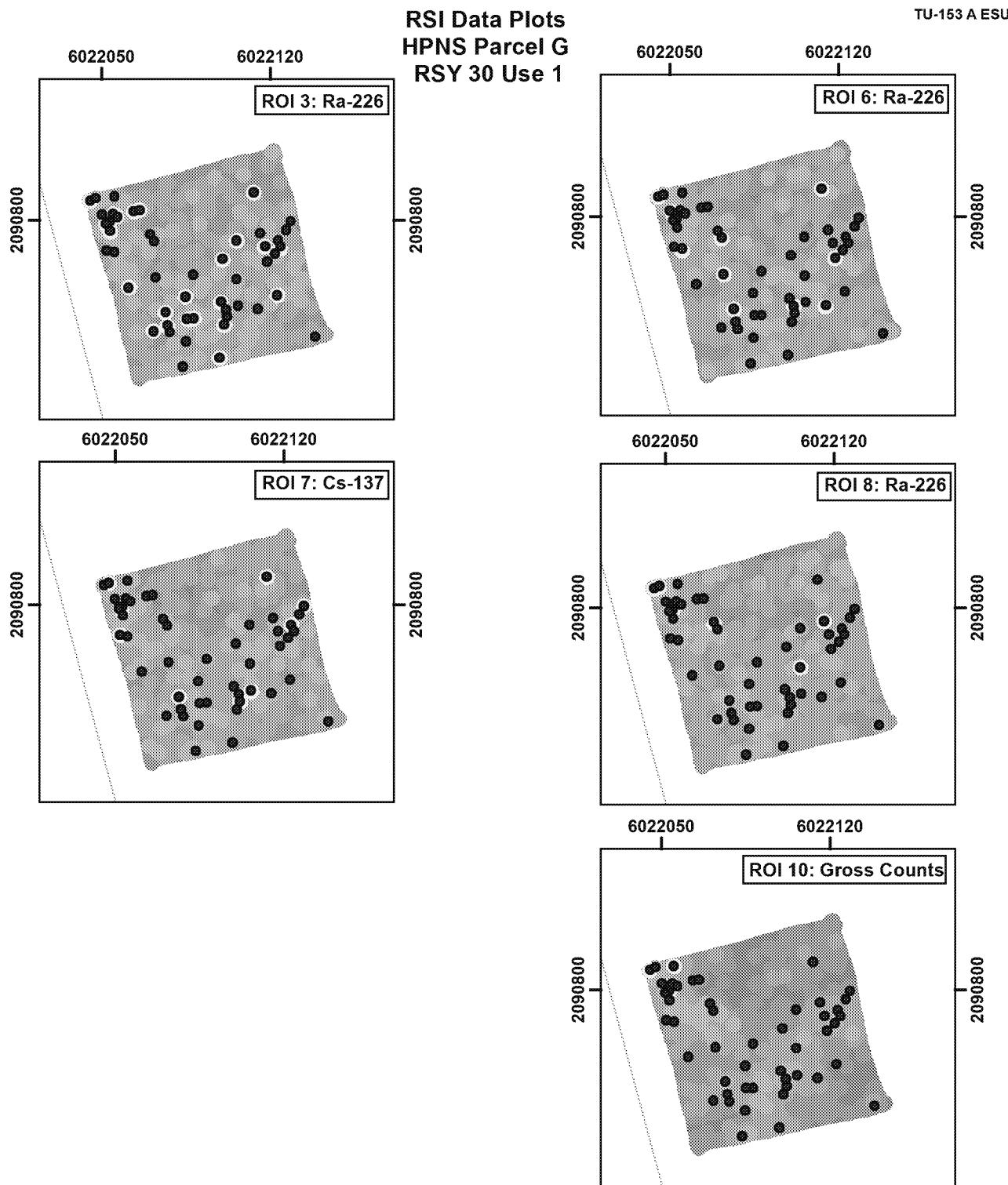


Soil Scan Statistics

Box Plots






RS 700 Gamma Walkover Survey Data (VD1)

- Follow-Up Locations
- > 3 std dev
- > 2 to < 3 std dev
- > 1 to < 2 std dev
- > 0 to < 1 std dev
- > -1 to < 0 std dev
- > -2 to < -1 std dev
- > -3 to < -2 std dev
- < -3 std dev

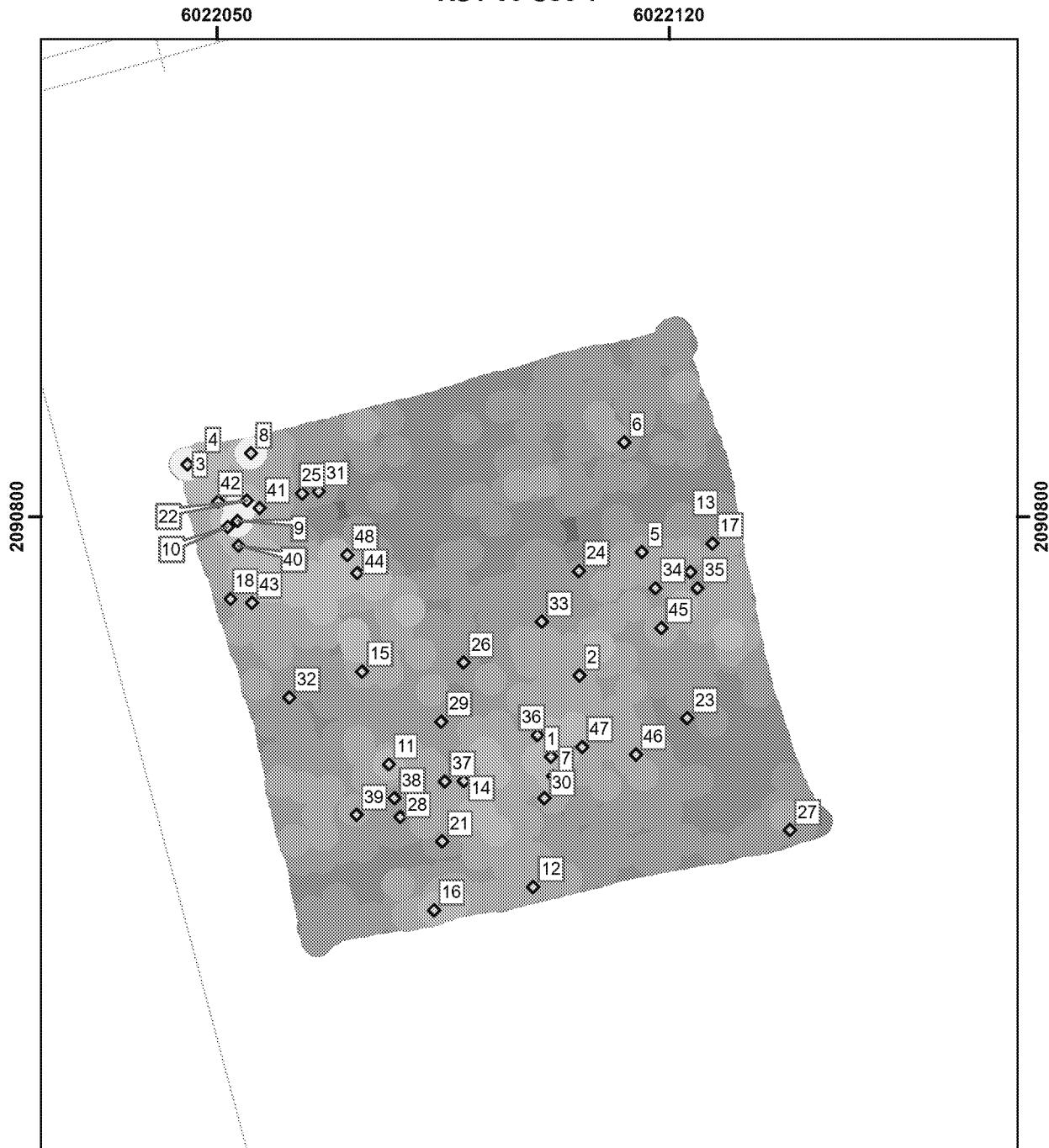
0 25 50 100
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**Follow-Up Locations
HPNS Parcel G
RSY 30 Use 1**

TU-153 A ESU



RSY 30 Use 1 (VD1, ROI 10 Gross Gamma)

- | | | |
|----------------------|-----------------------|------------------------|
| ◆ Follow-Up Location | ● > 1 to < 2 std dev | ● > -2 to < -1 std dev |
| > 3 std dev | ● > 0 to < 1 std dev | ● > -3 to < -2 std dev |
| ● > 2 to < 3 std dev | ● > -1 to < 0 std dev | ● < -3 std dev |

20 10 0 20 Feet

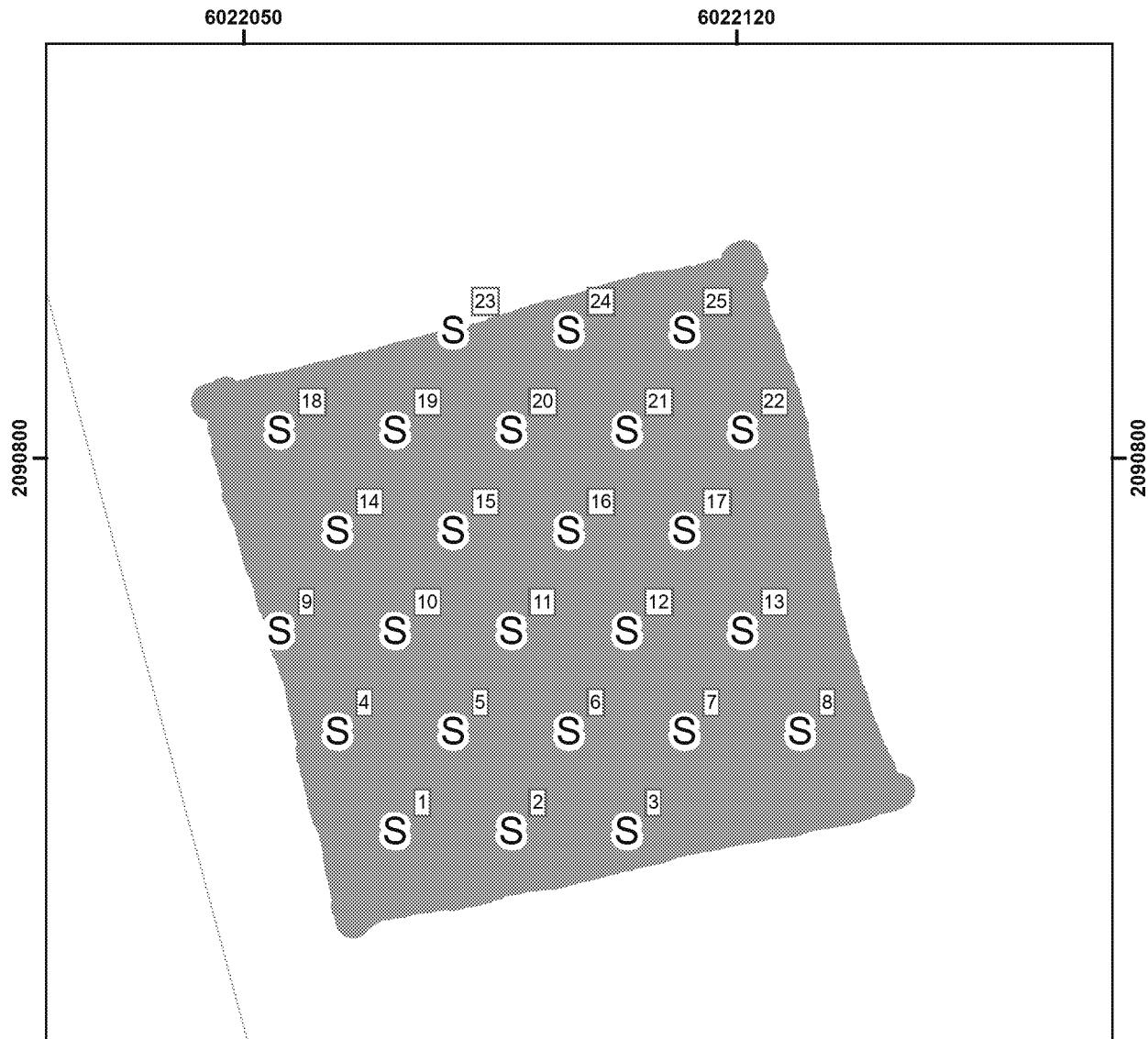
Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM

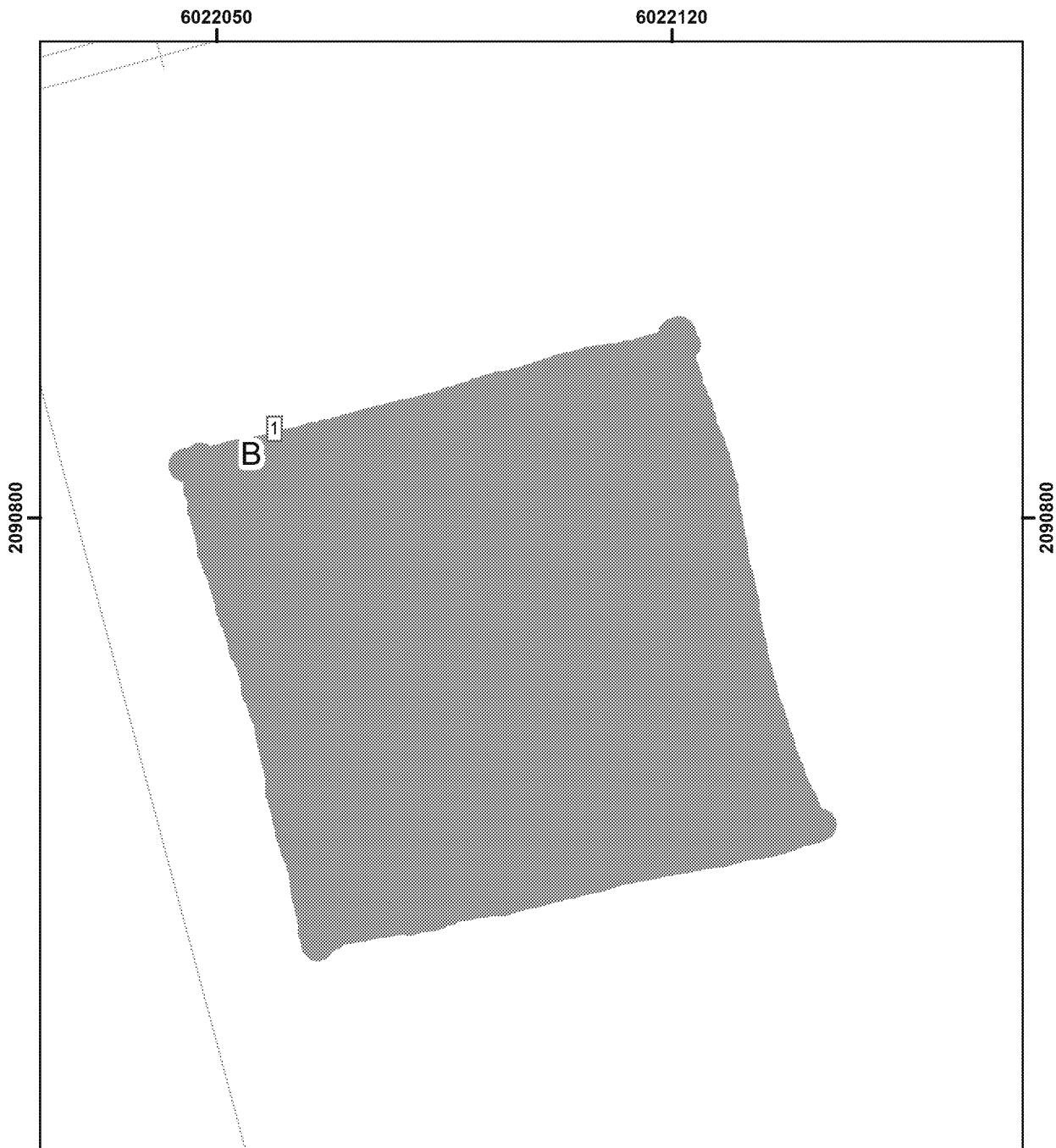
Systematic Samples
HPNS Parcel G
RSY 30 Use 1

TU-153A ESU



**Biased Sampling
HPNS Parcel G
RSY 30 Use 1**

TU-153A ESU



RSY 30 Use 1

B Biased Sample Locations

● RS-700 GWS Coverage

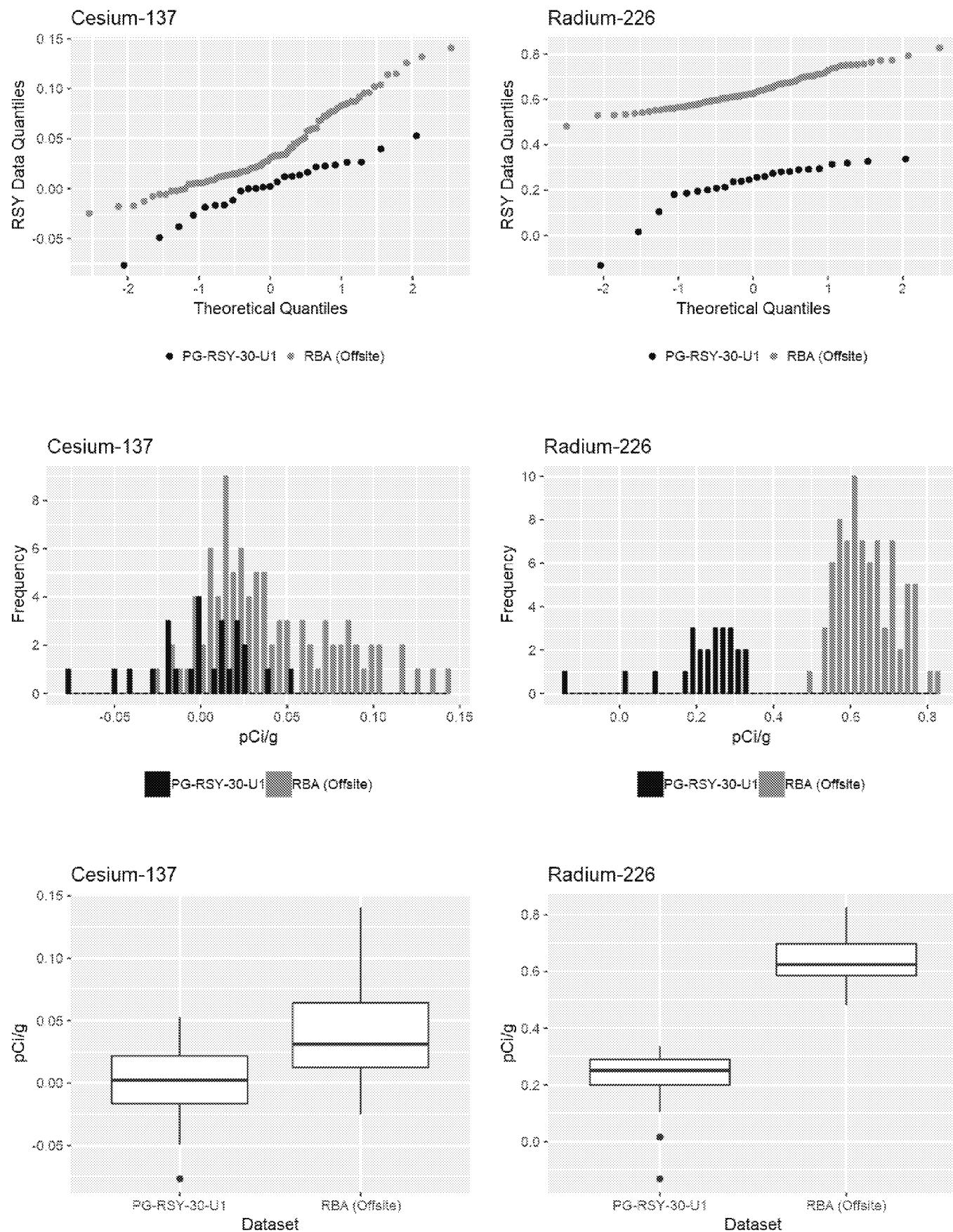
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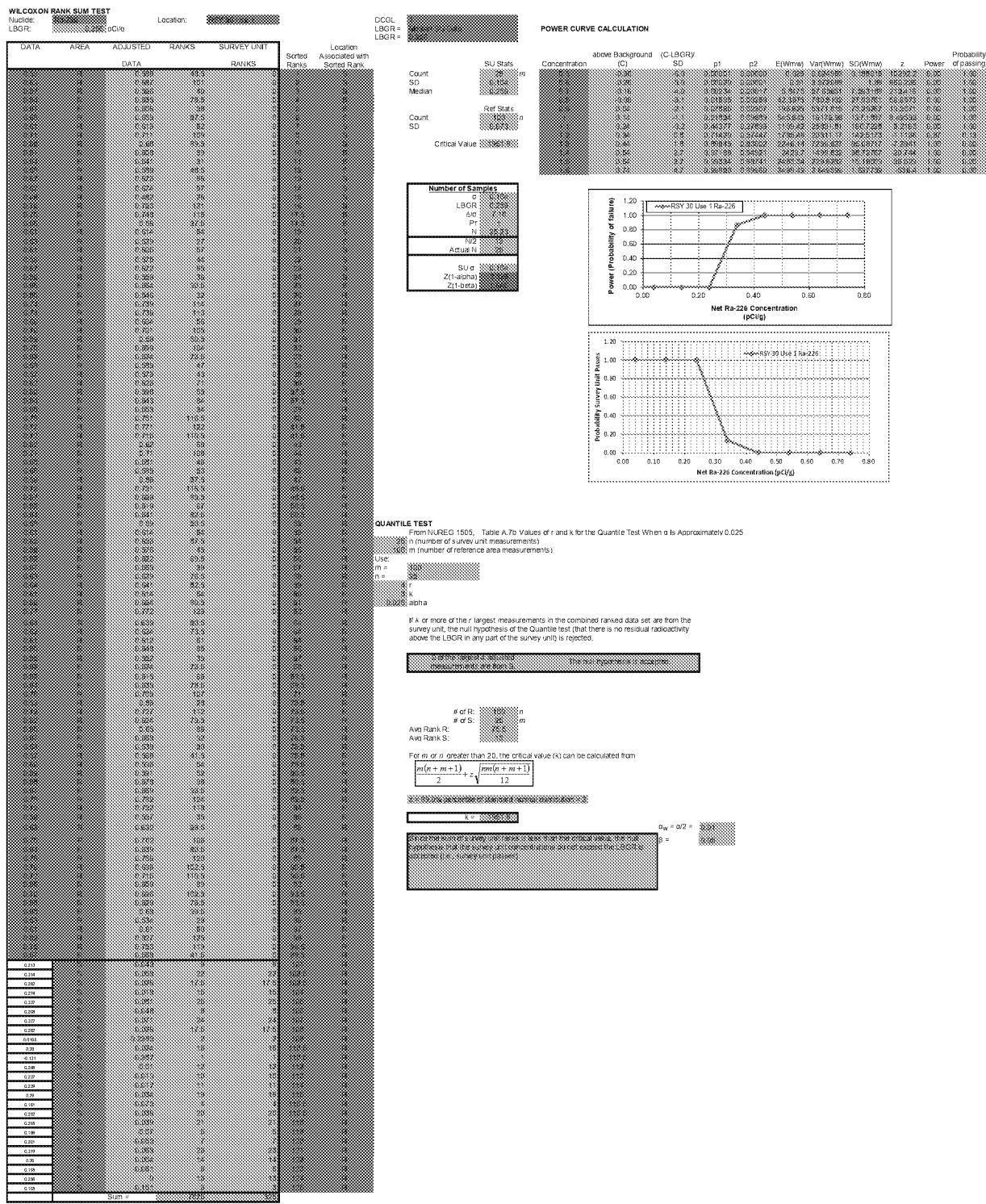
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APTIM

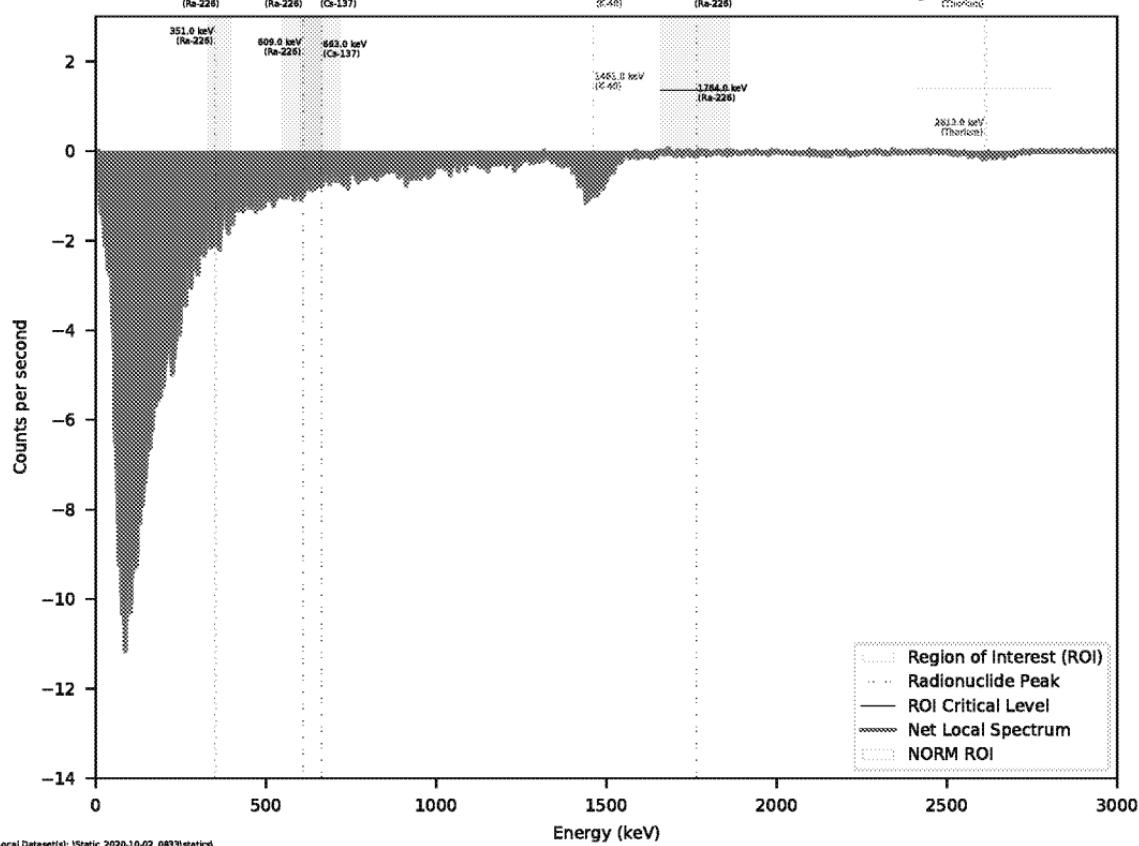
Soil Sample Statistics





Net Gamma Spectrum, Static Location: 1

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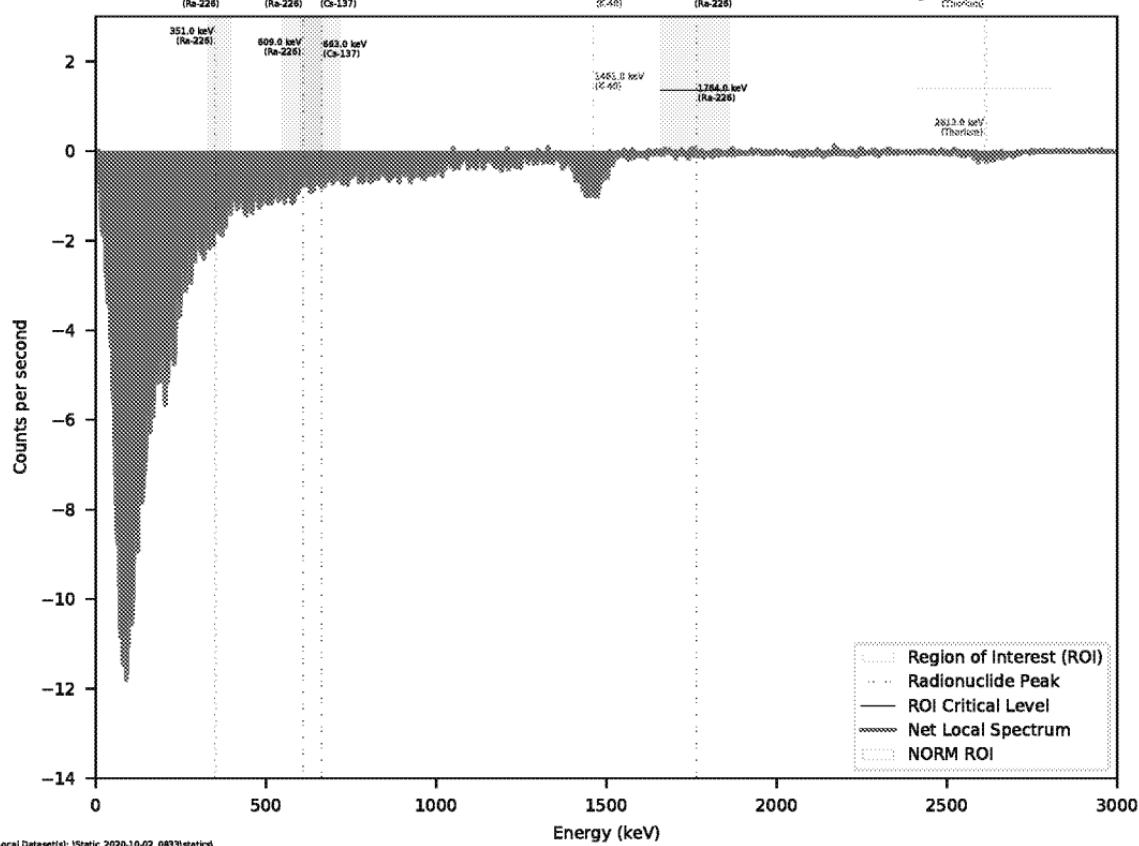
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Net Gamma Spectrum, Static Location: 2

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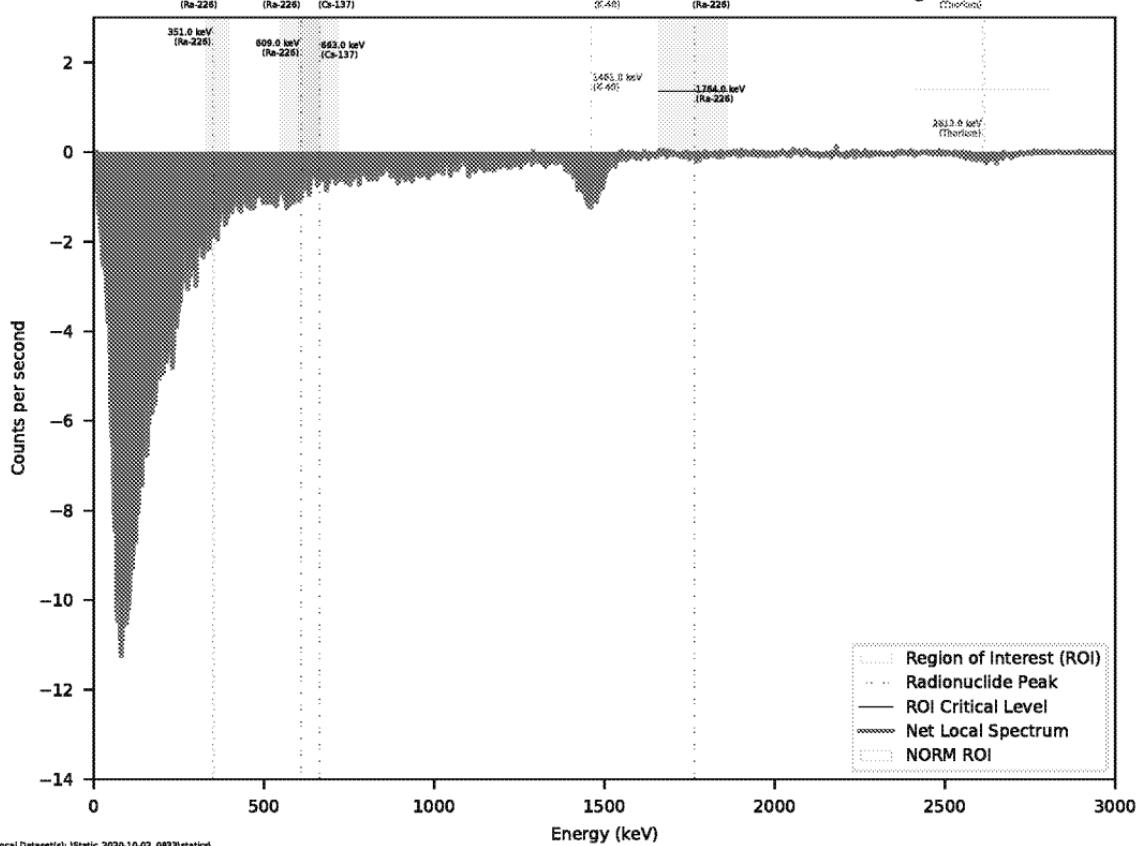
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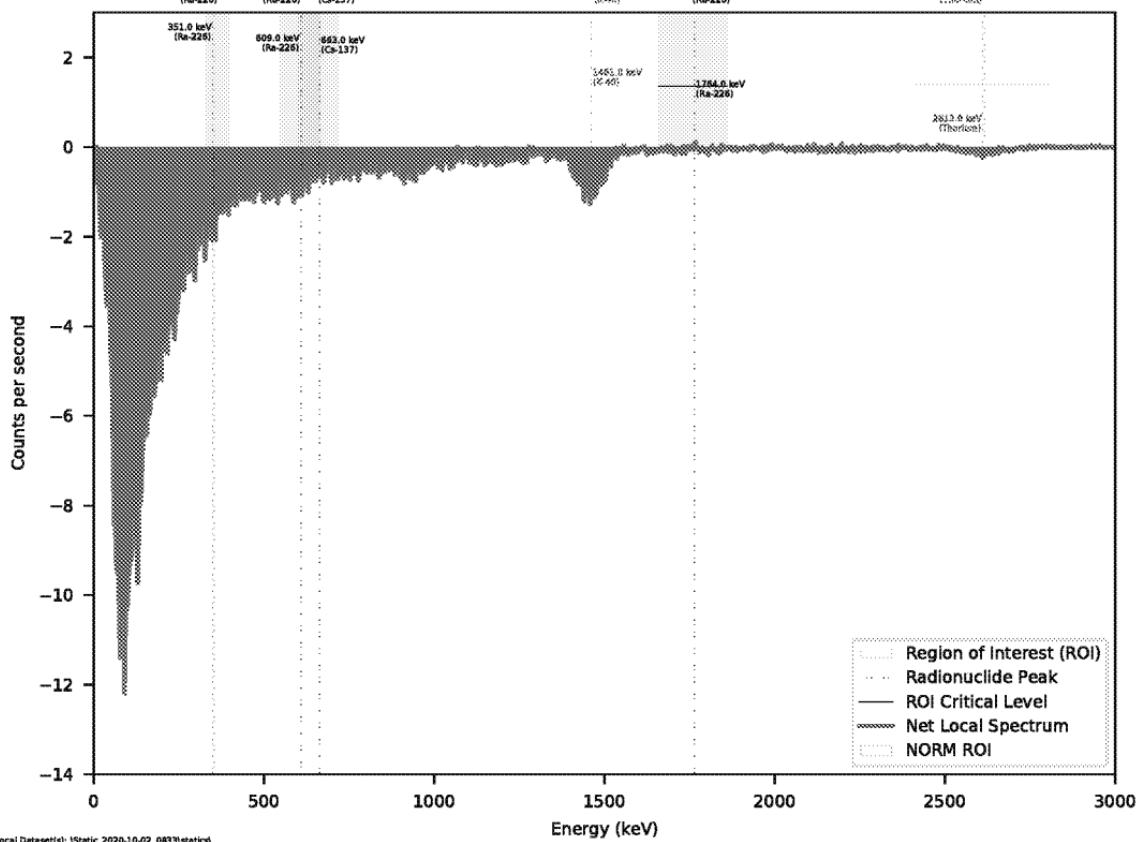
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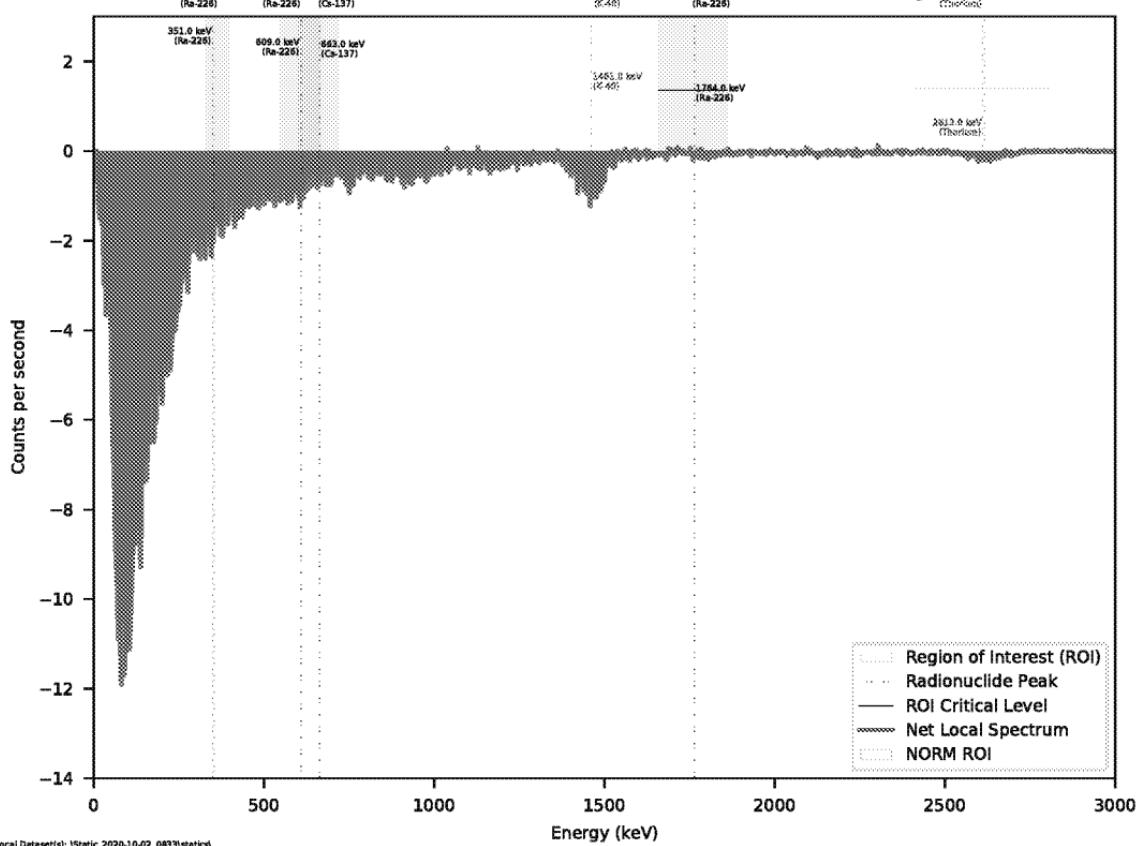
Net Gamma Spectrum, Static Location: 4

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Net Gamma Spectrum, Static Location: 5

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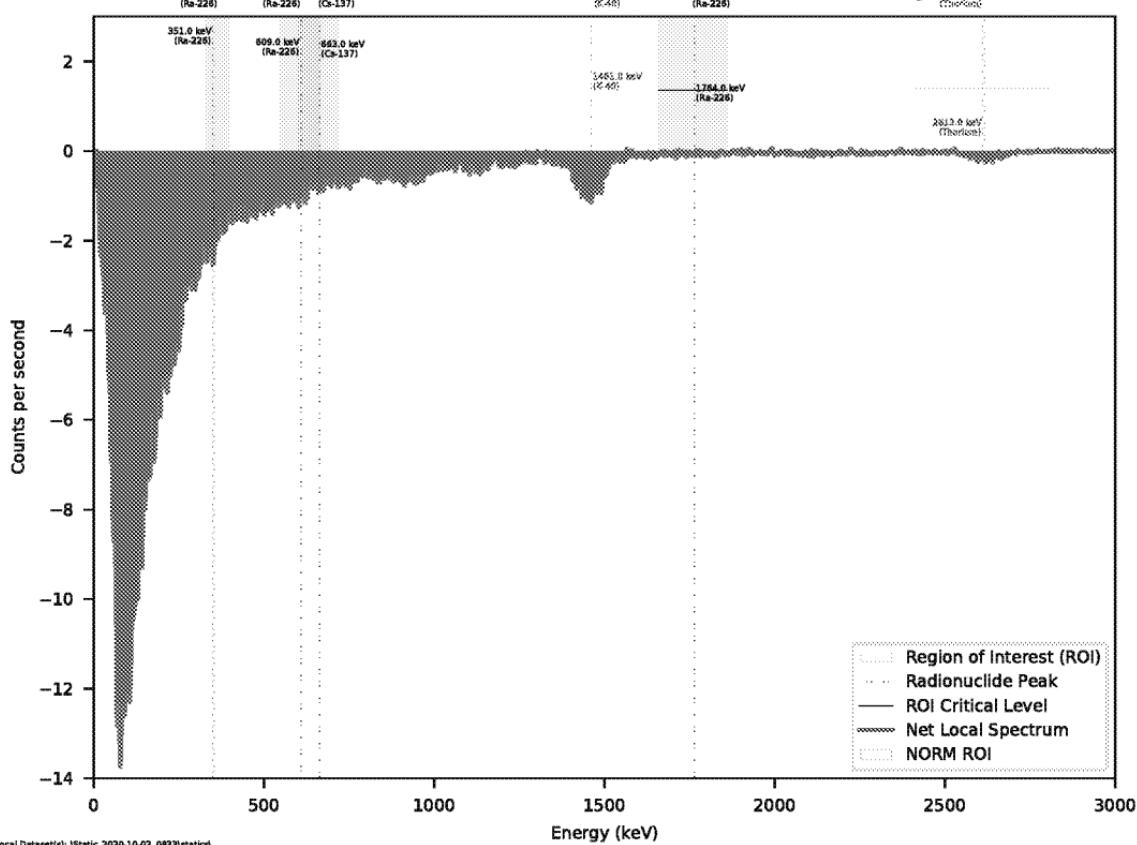
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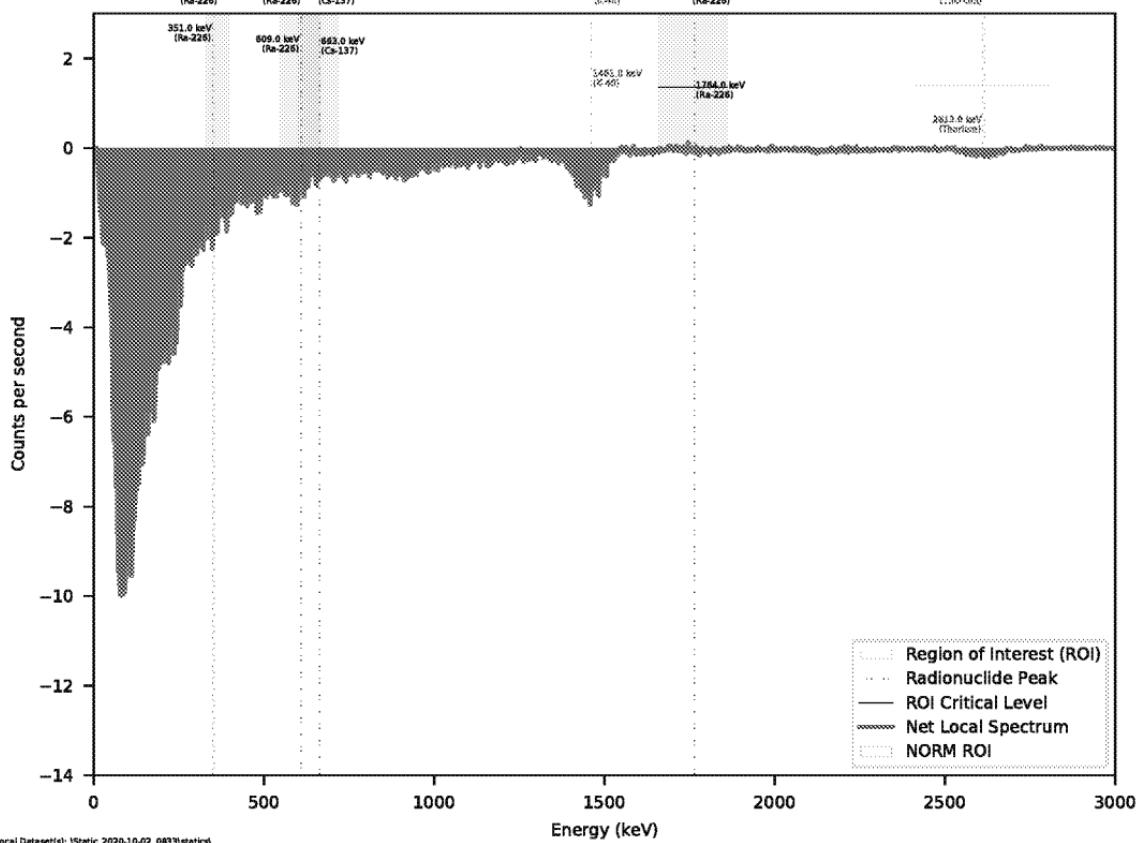
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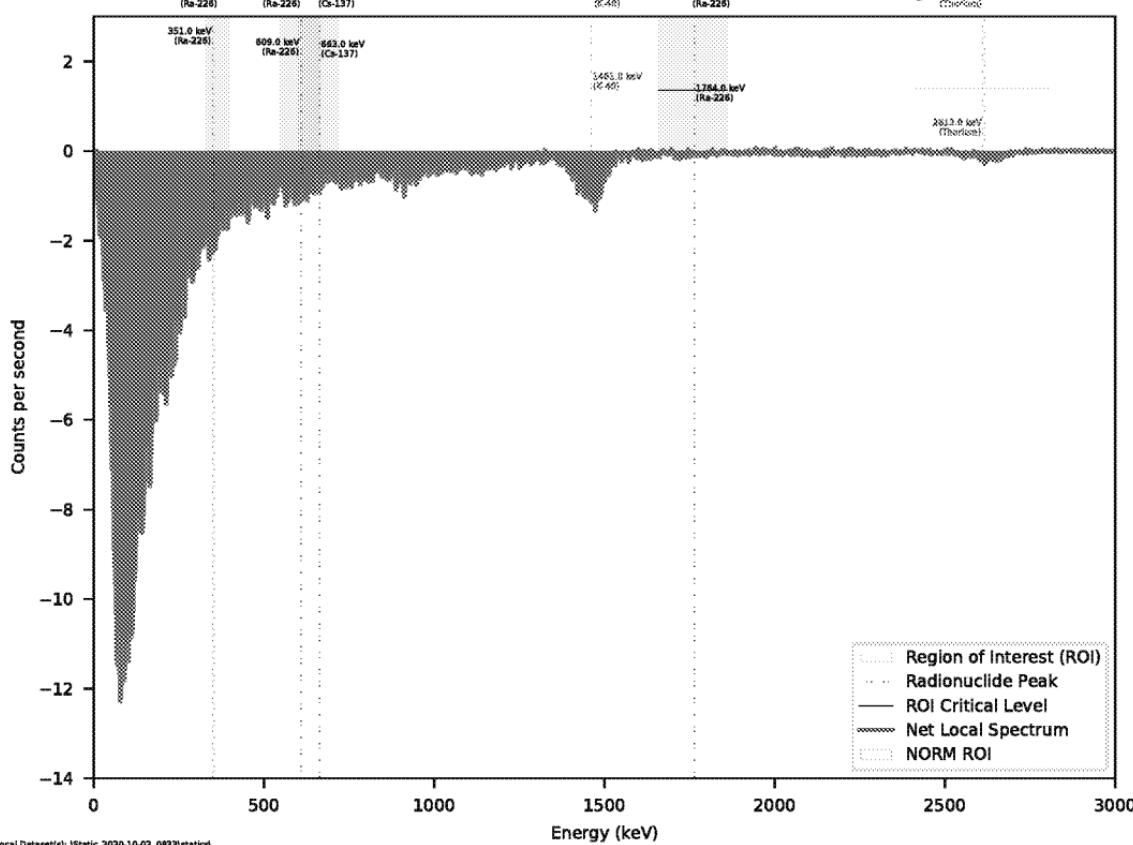
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Net Gamma Spectrum, Static Location: 8

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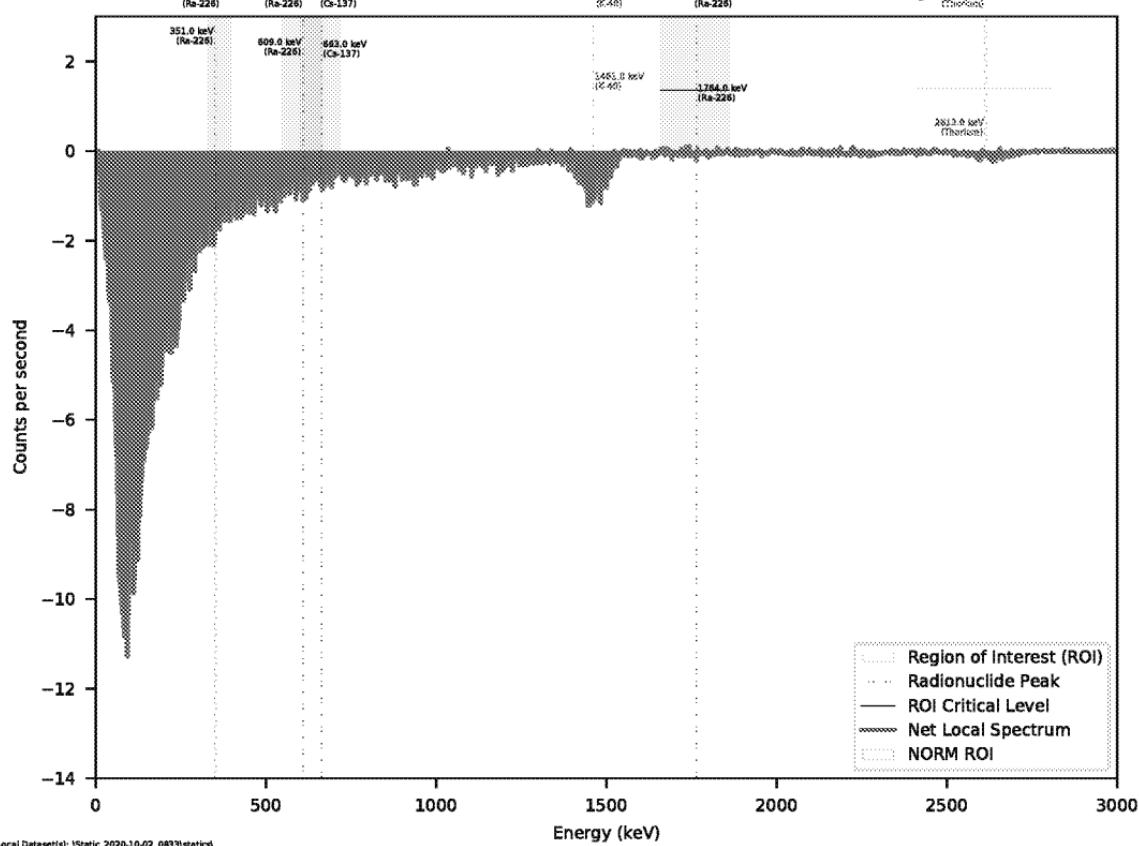
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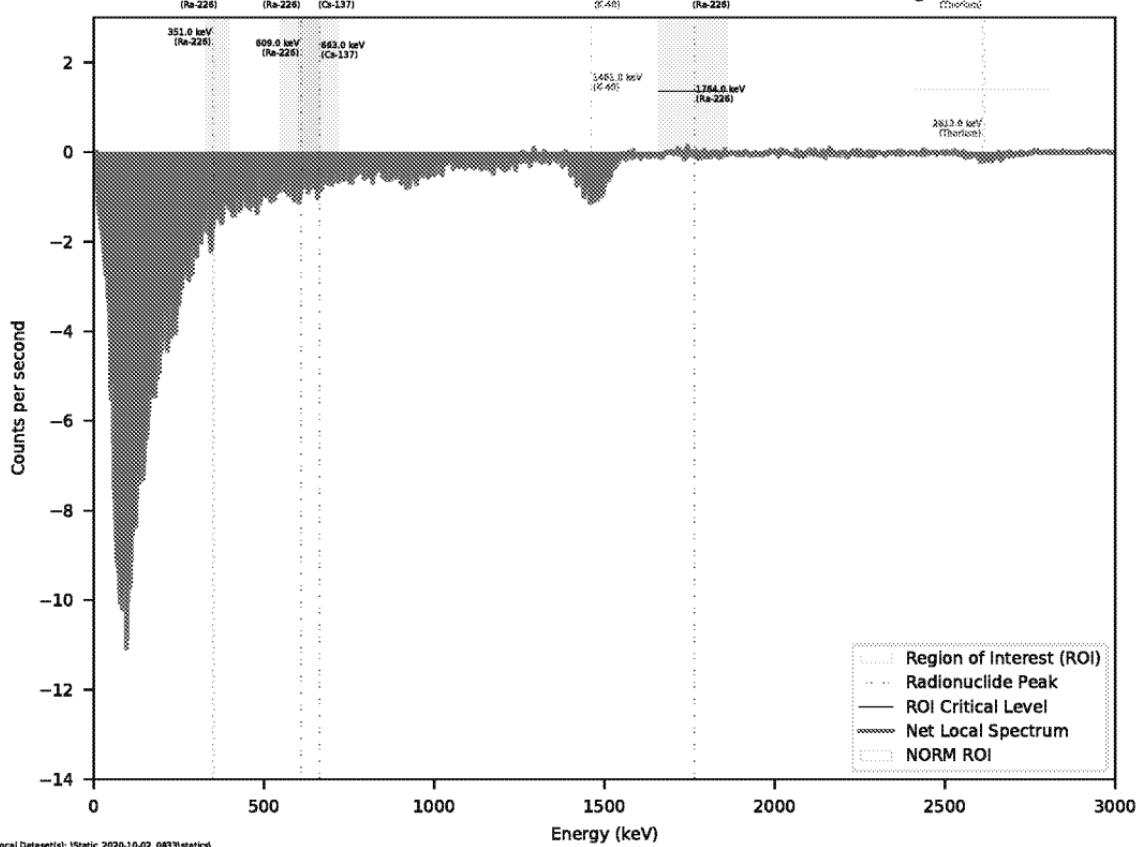
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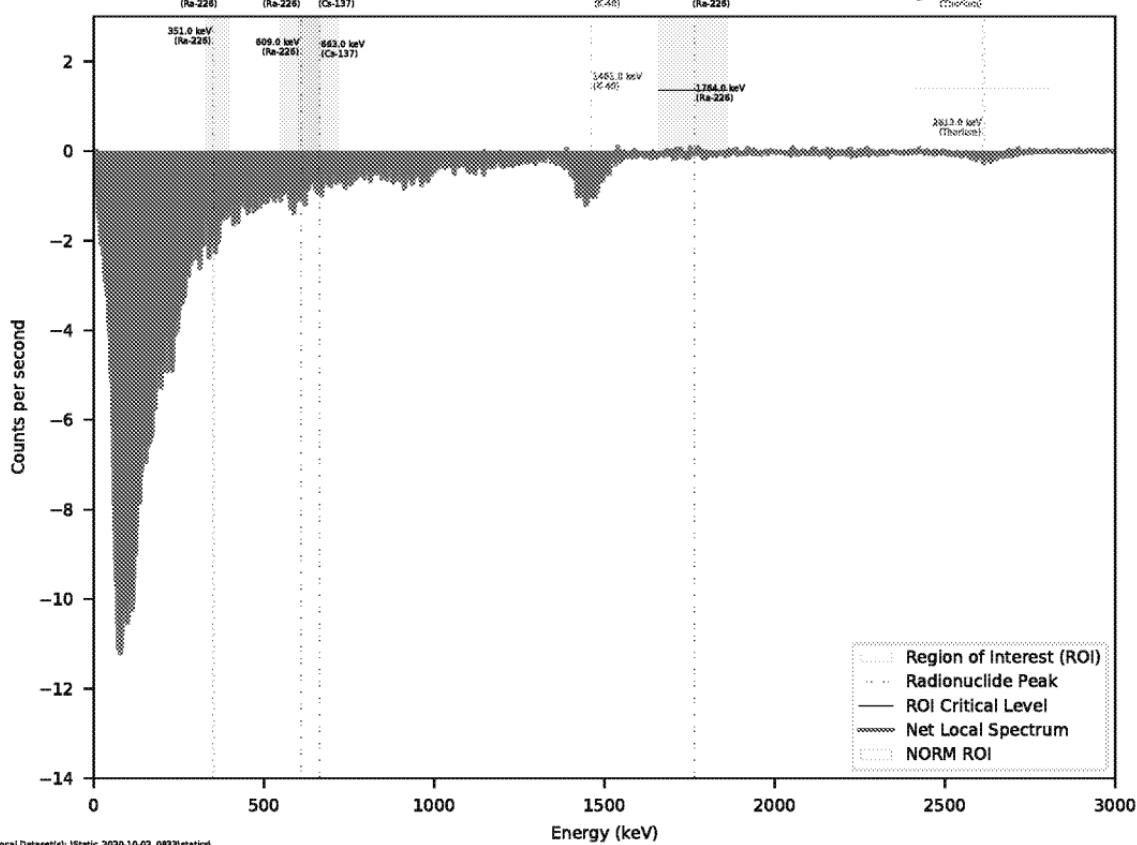
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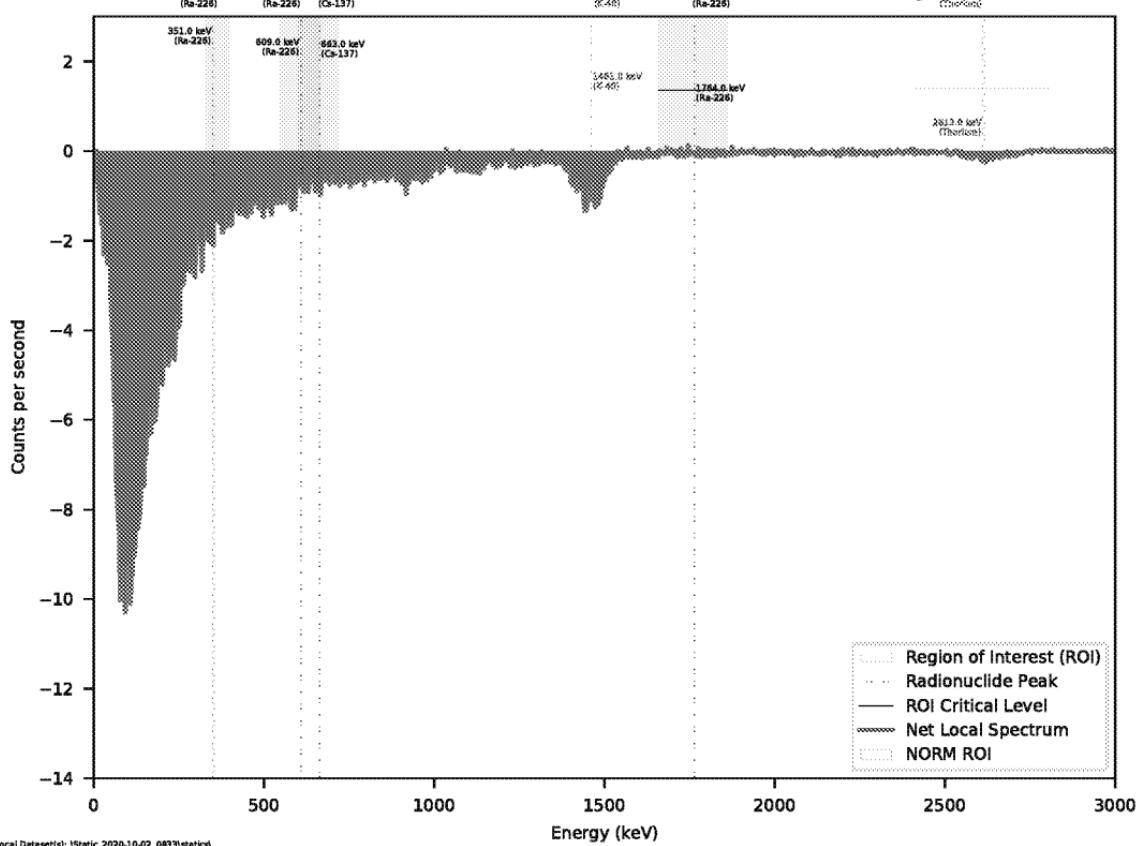
Net Gamma Spectrum, Static Location: 11

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Net Gamma Spectrum, Static Location: 12

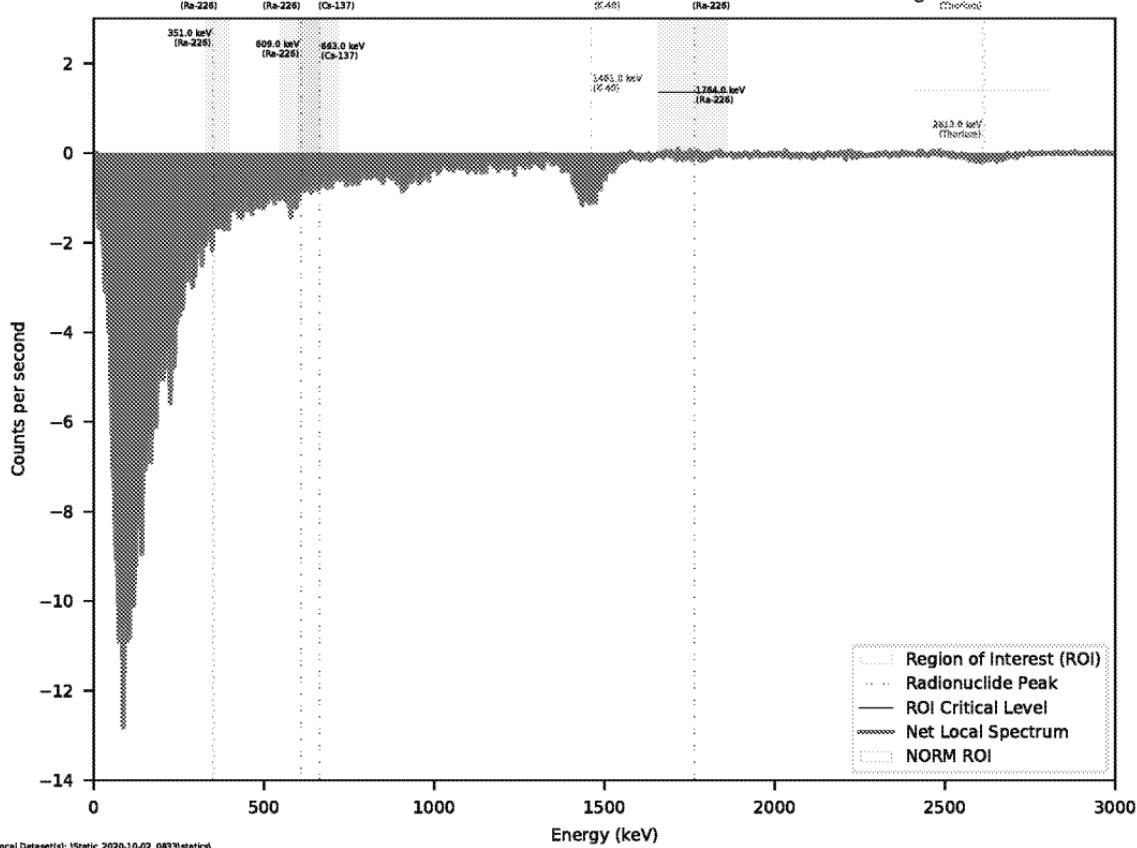
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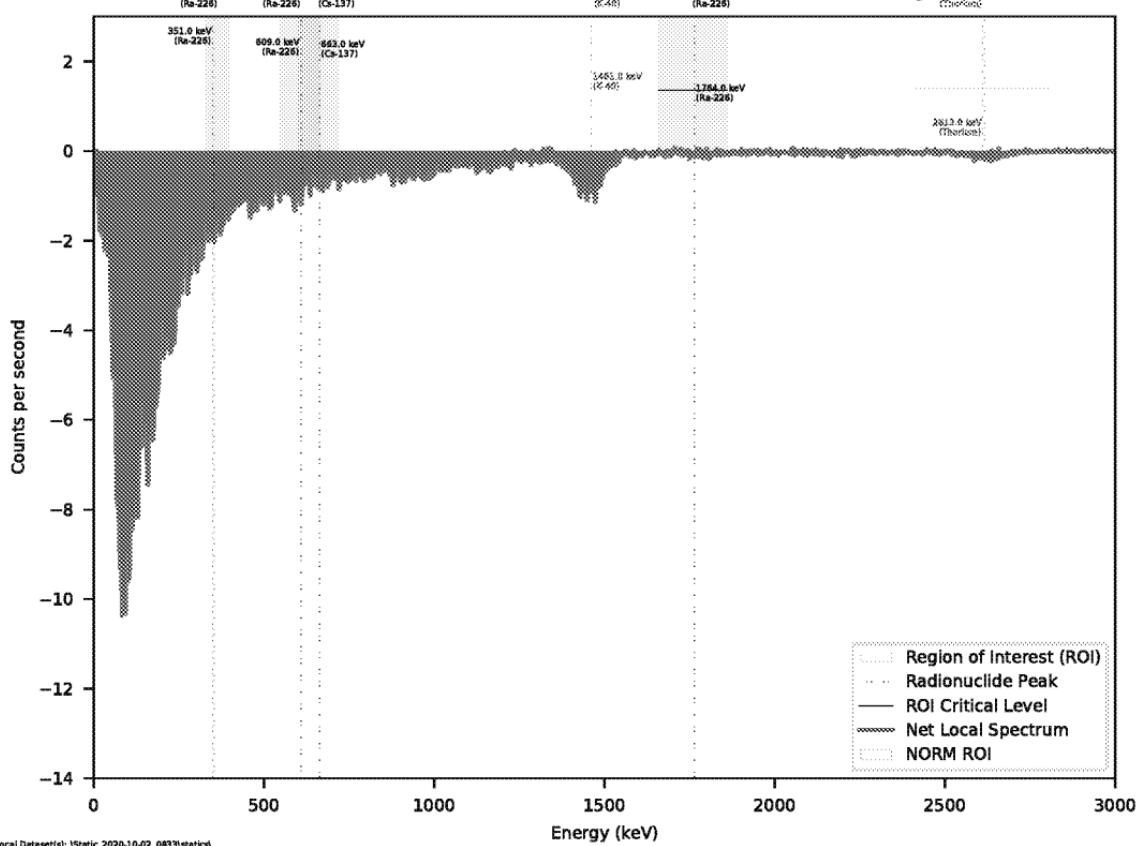
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Net Gamma Spectrum, Static Location: 14

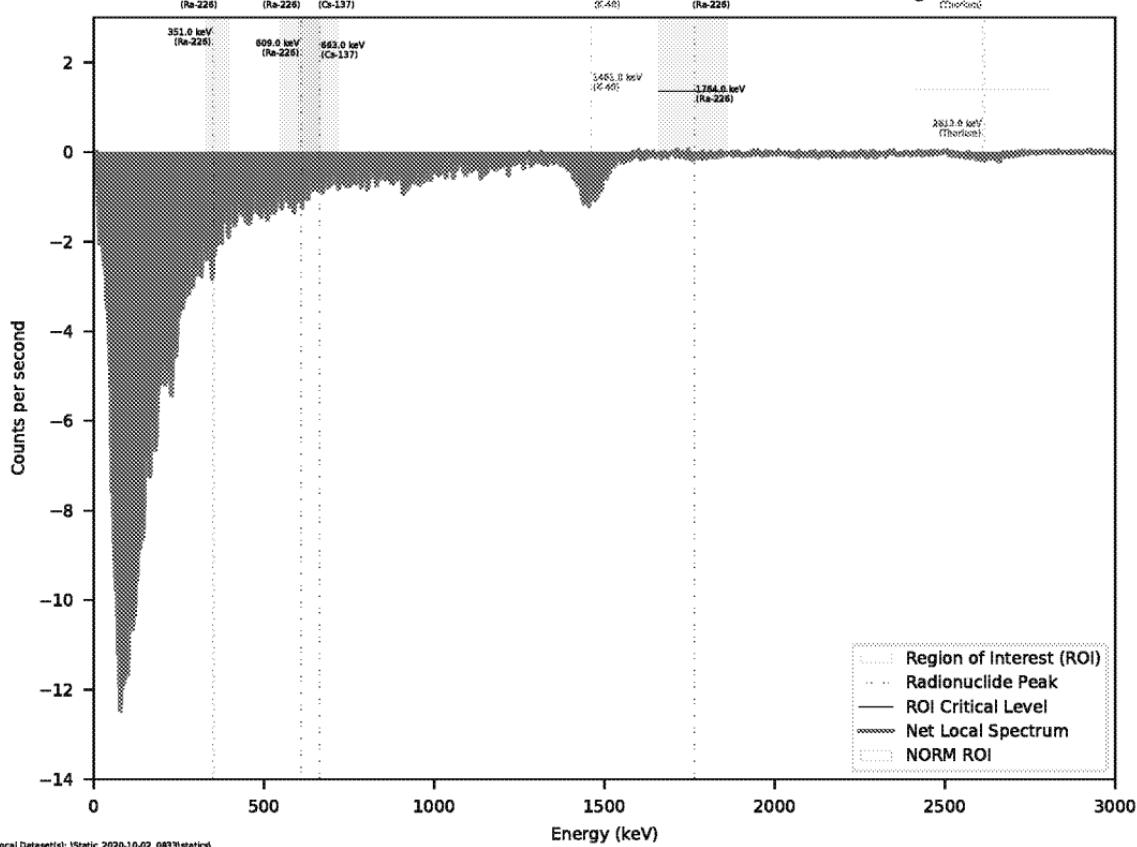
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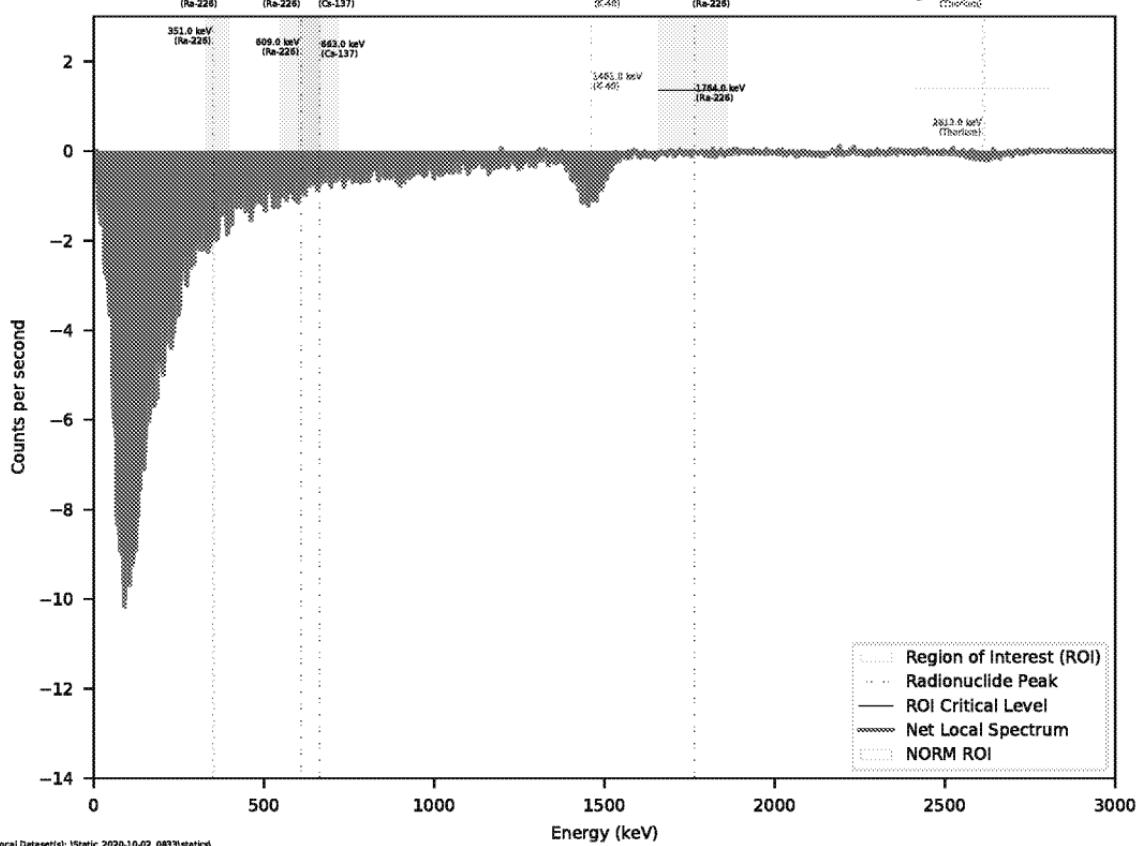
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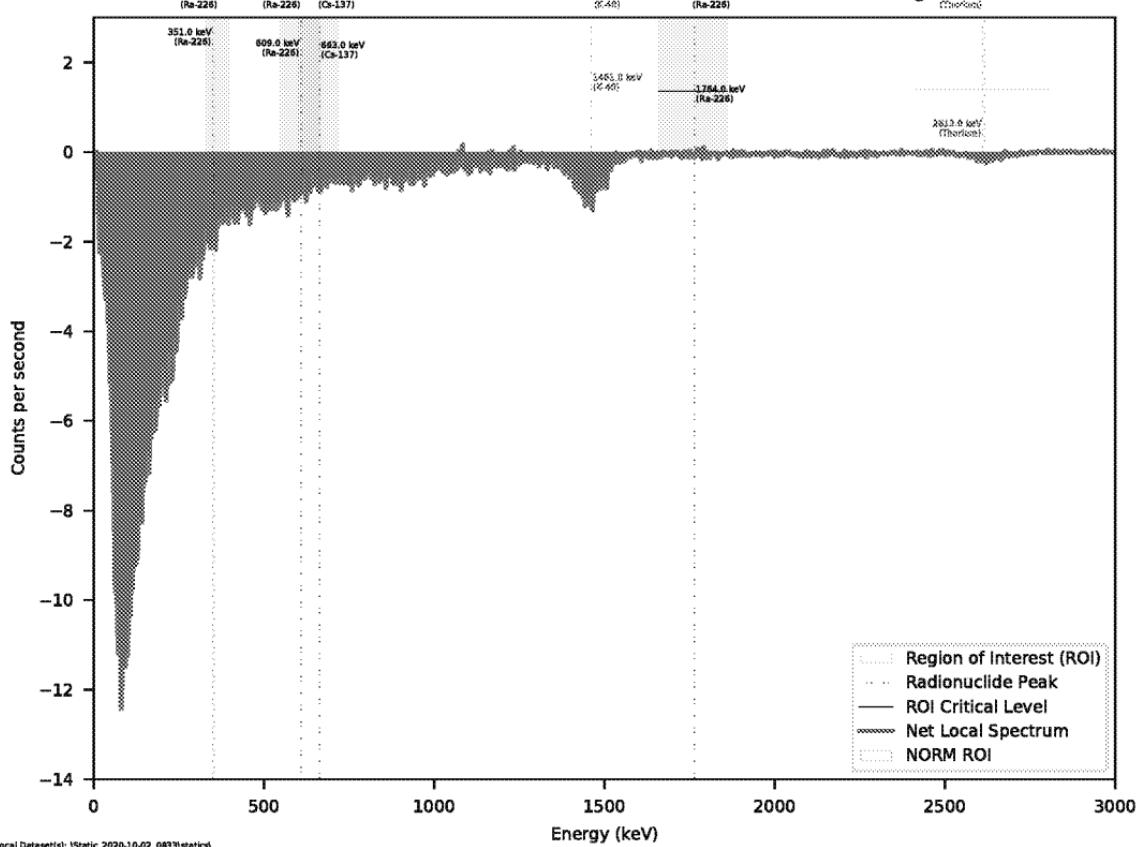
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Net Gamma Spectrum, Static Location: 17

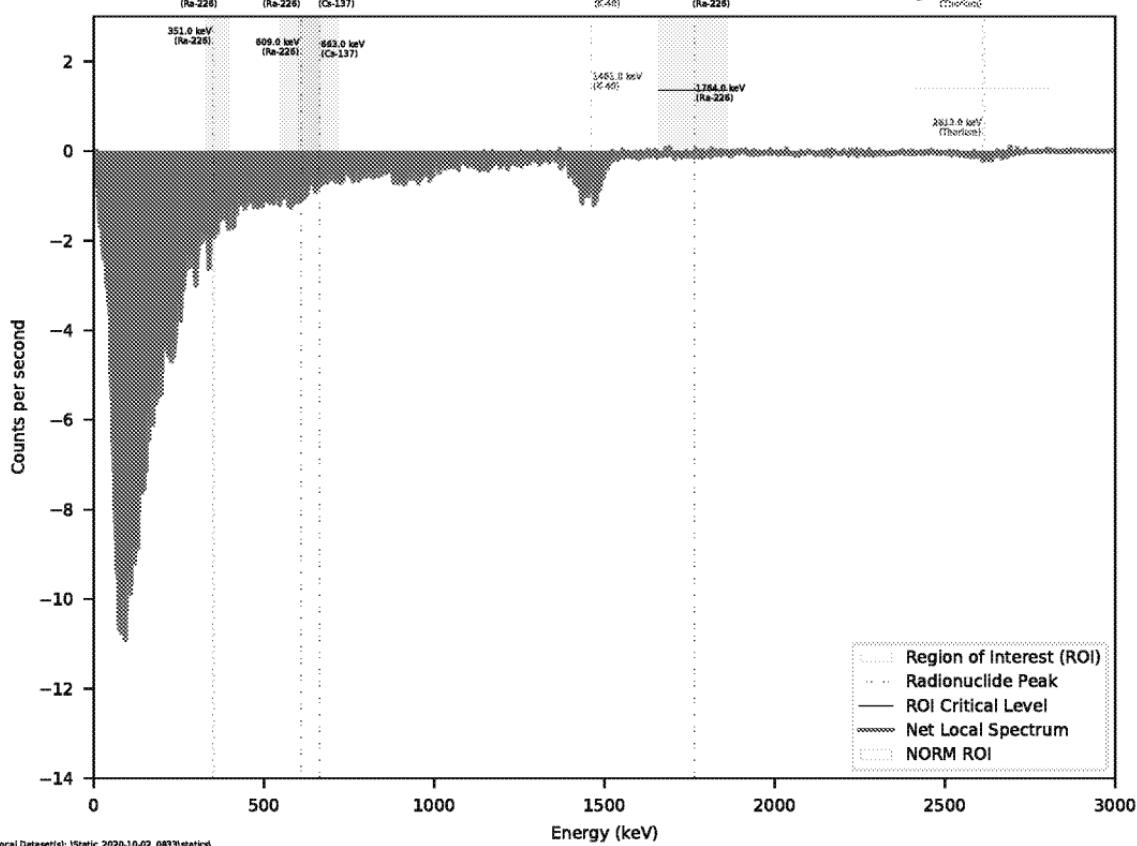
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Net Gamma Spectrum, Static Location: 18

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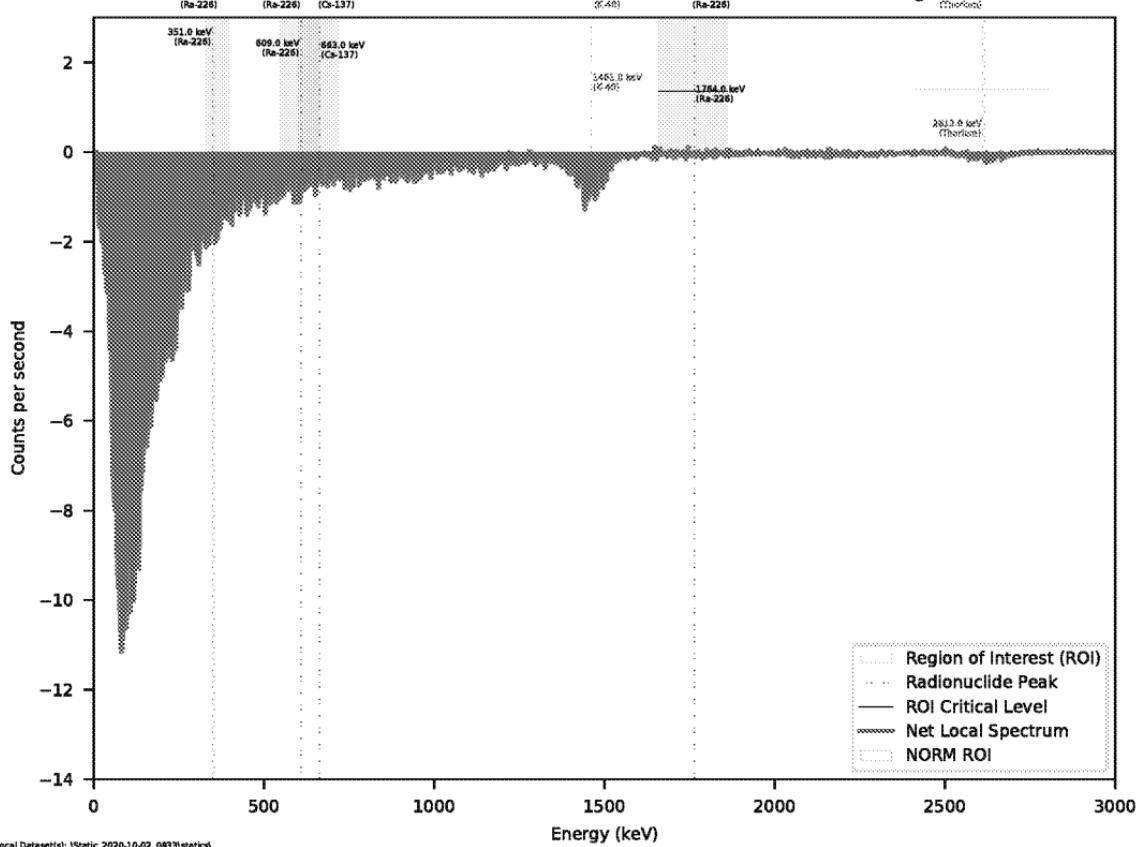
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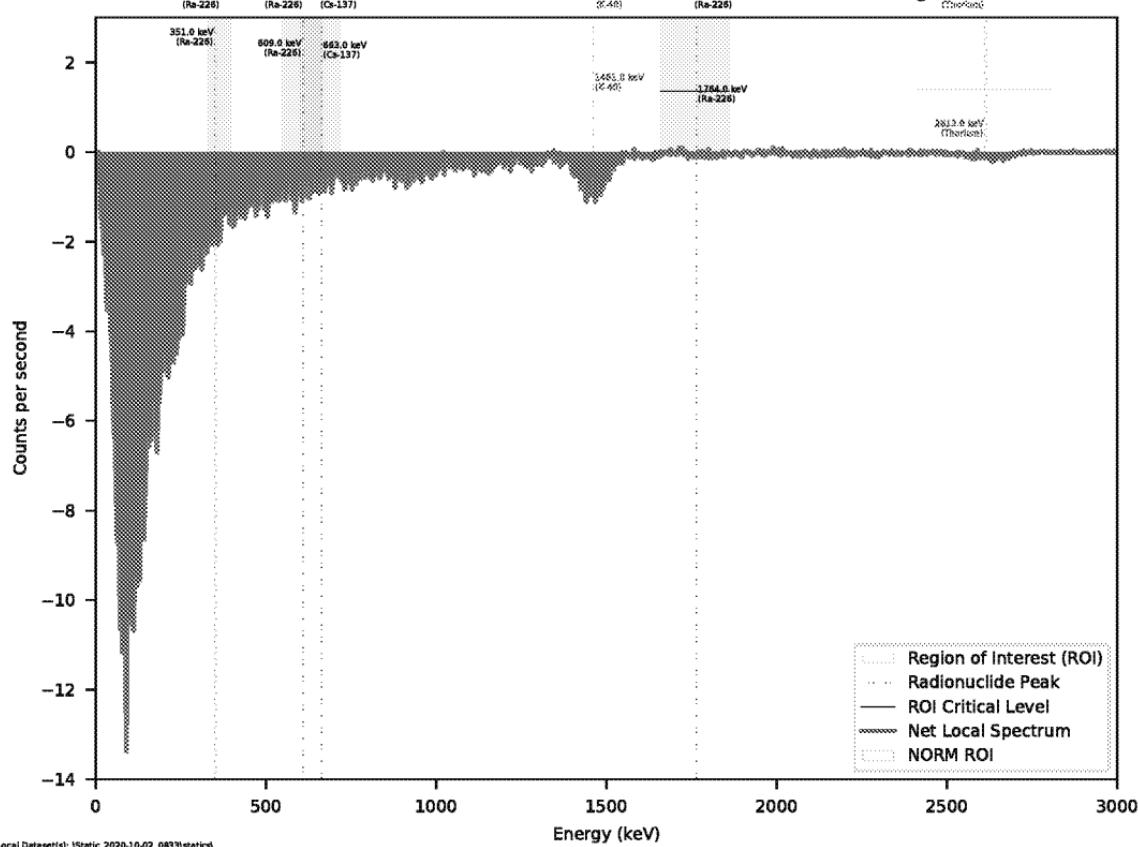
Net Gamma Spectrum, Static Location: 19

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Net Gamma Spectrum, Static Location: 20

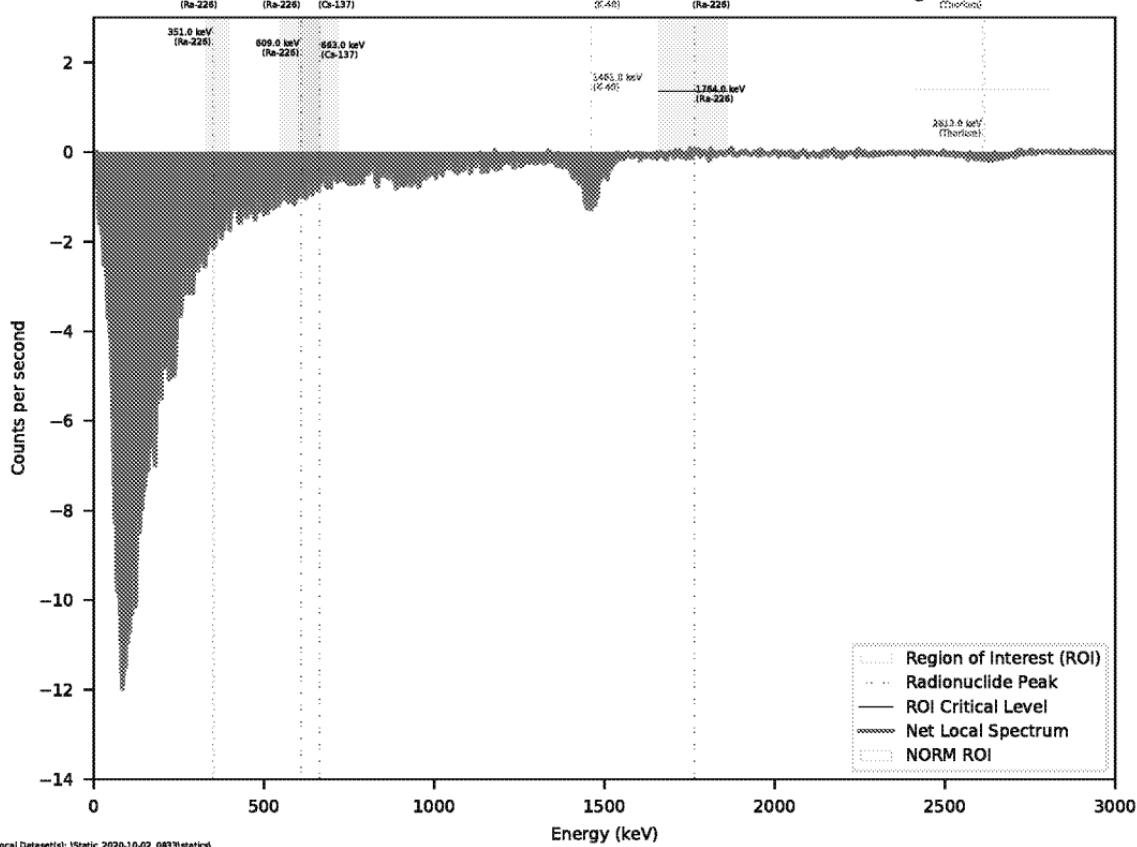
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Net Gamma Spectrum, Static Location: 21

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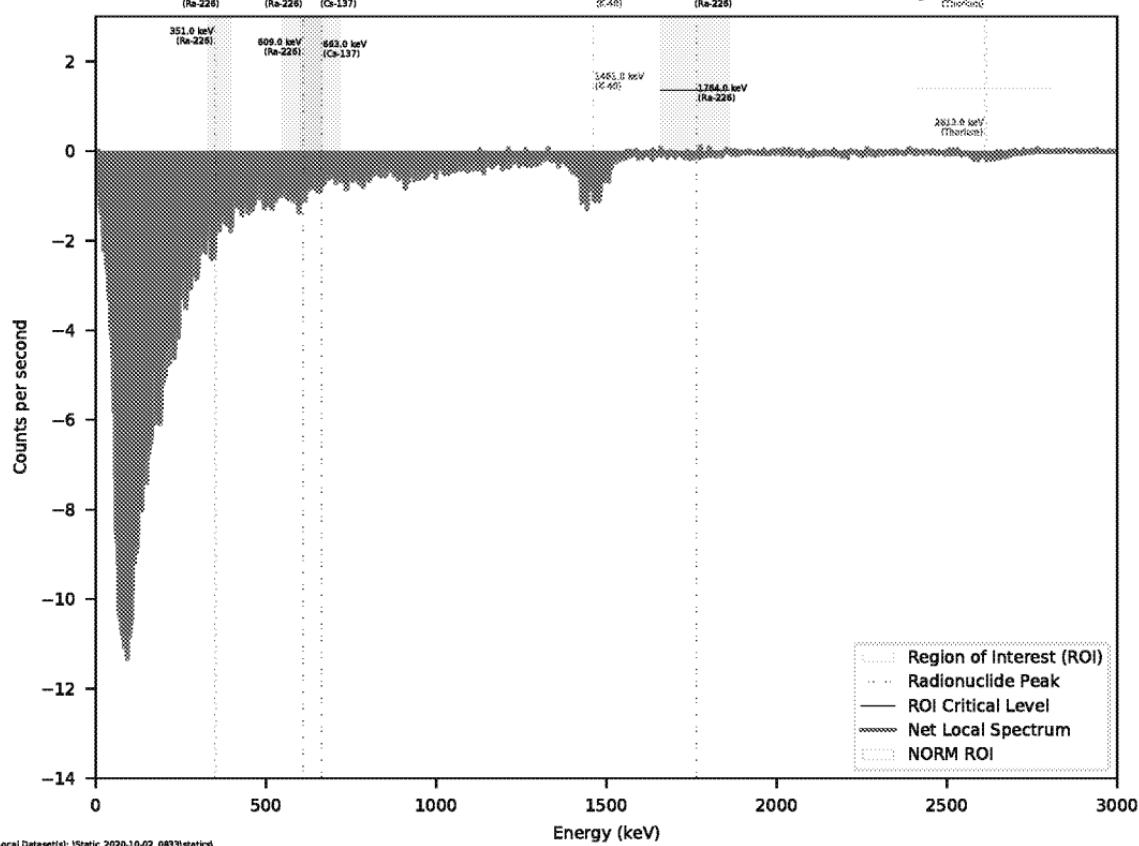
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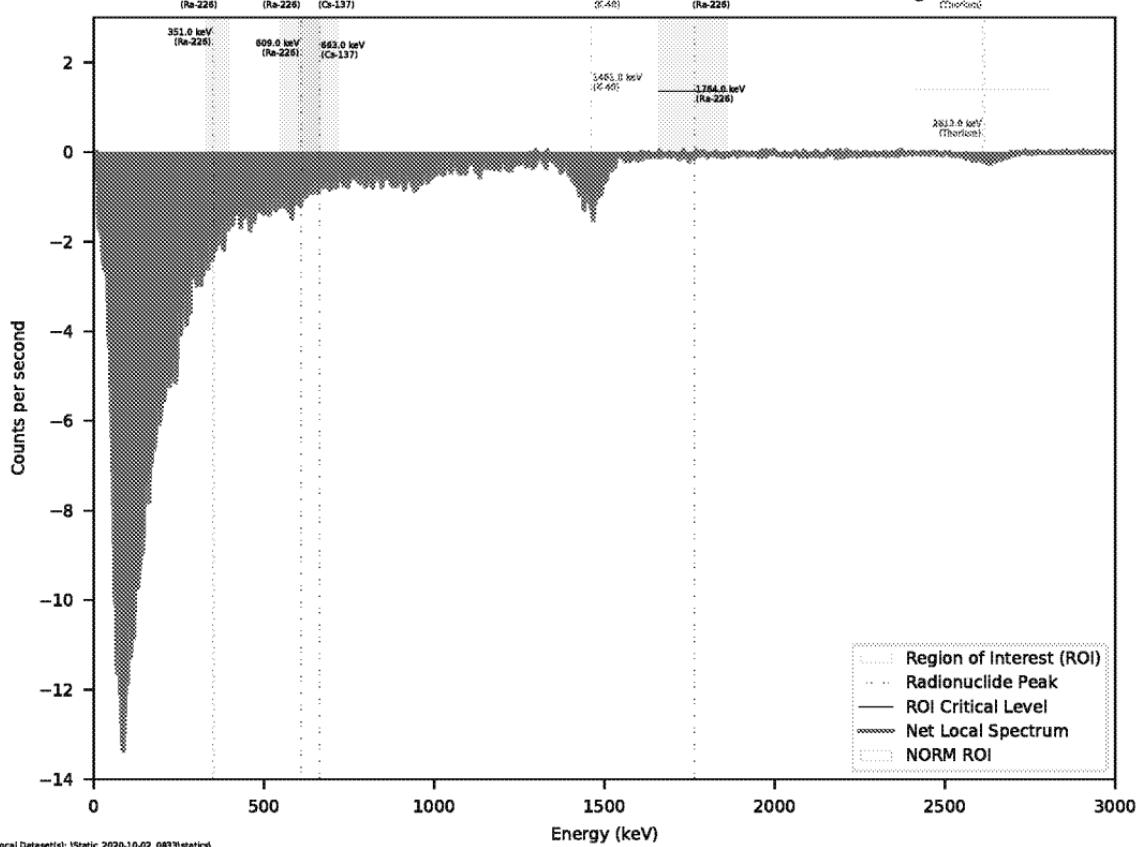
Net Gamma Spectrum, Static Location: 22

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Net Gamma Spectrum, Static Location: 23

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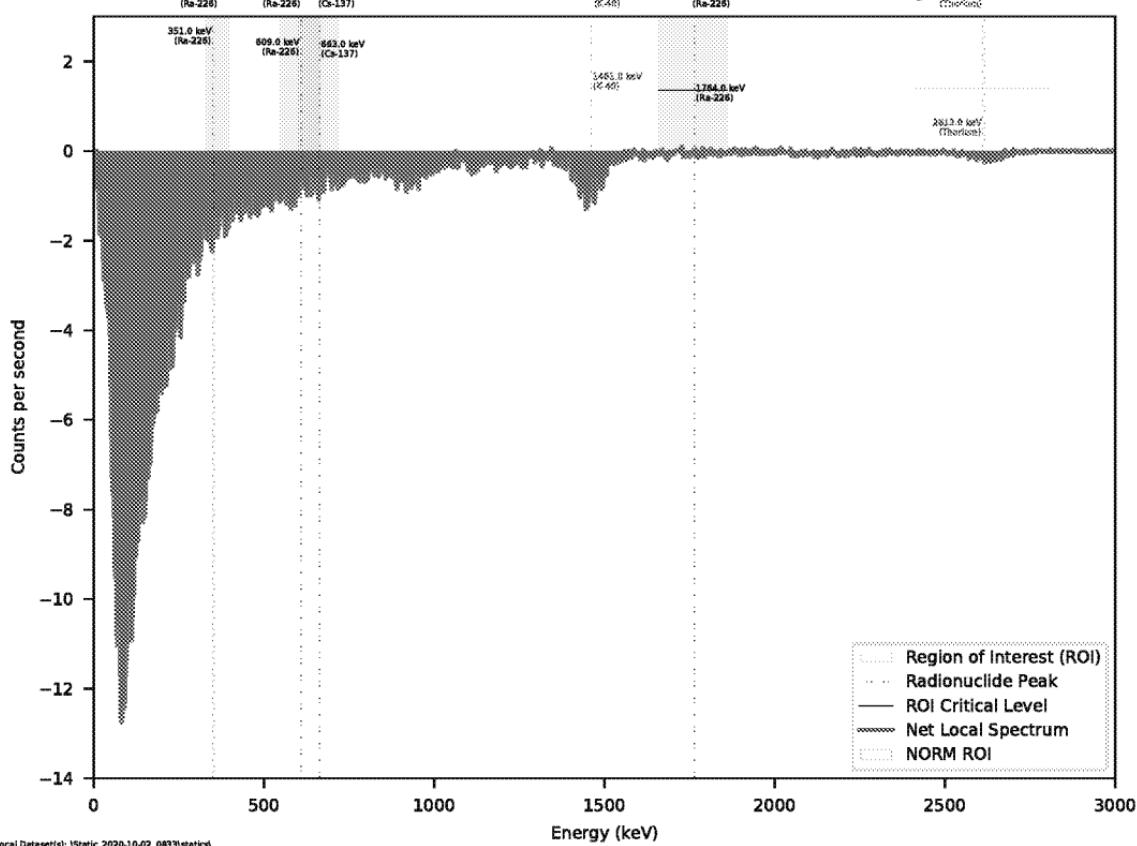
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Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36558945606063, 37.72205544090905

ED_006360A_00000406-00036

Net Gamma Spectrum, Static Location: 24

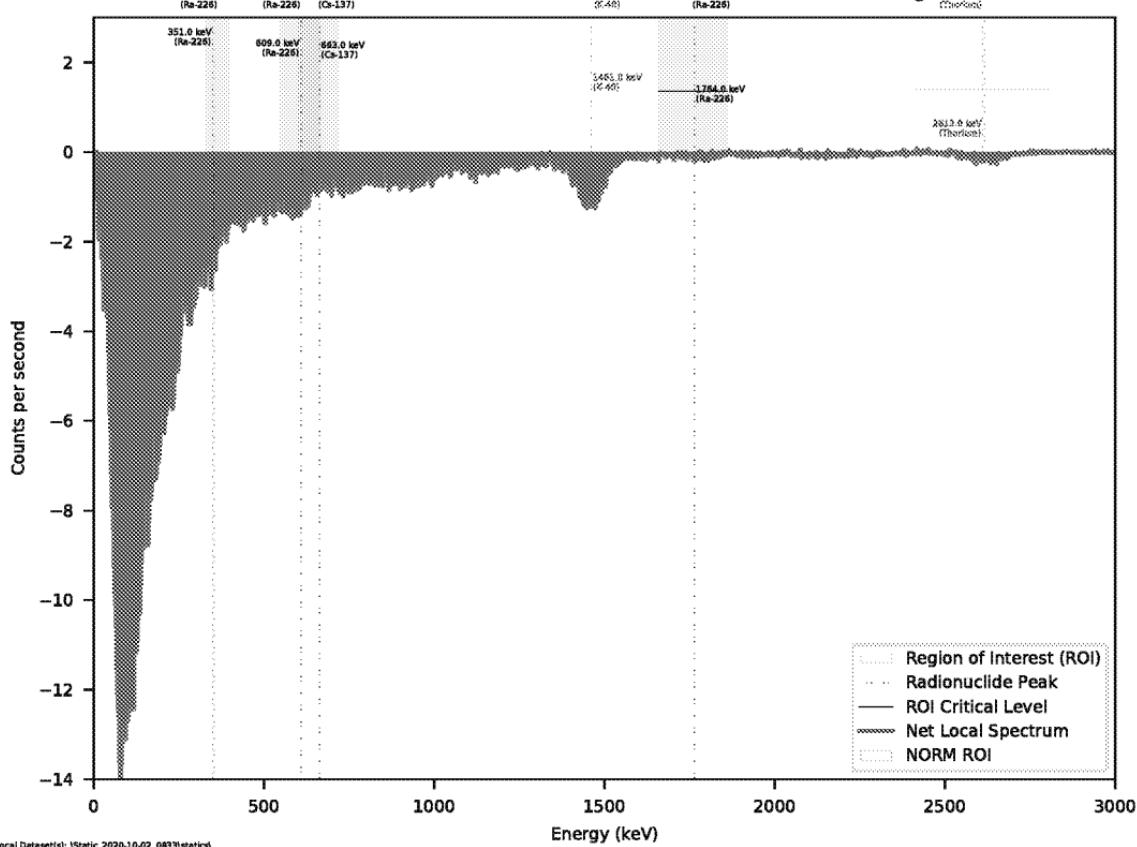
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ED_006360A_00000406-00037

Net Gamma Spectrum, Static Location: 25

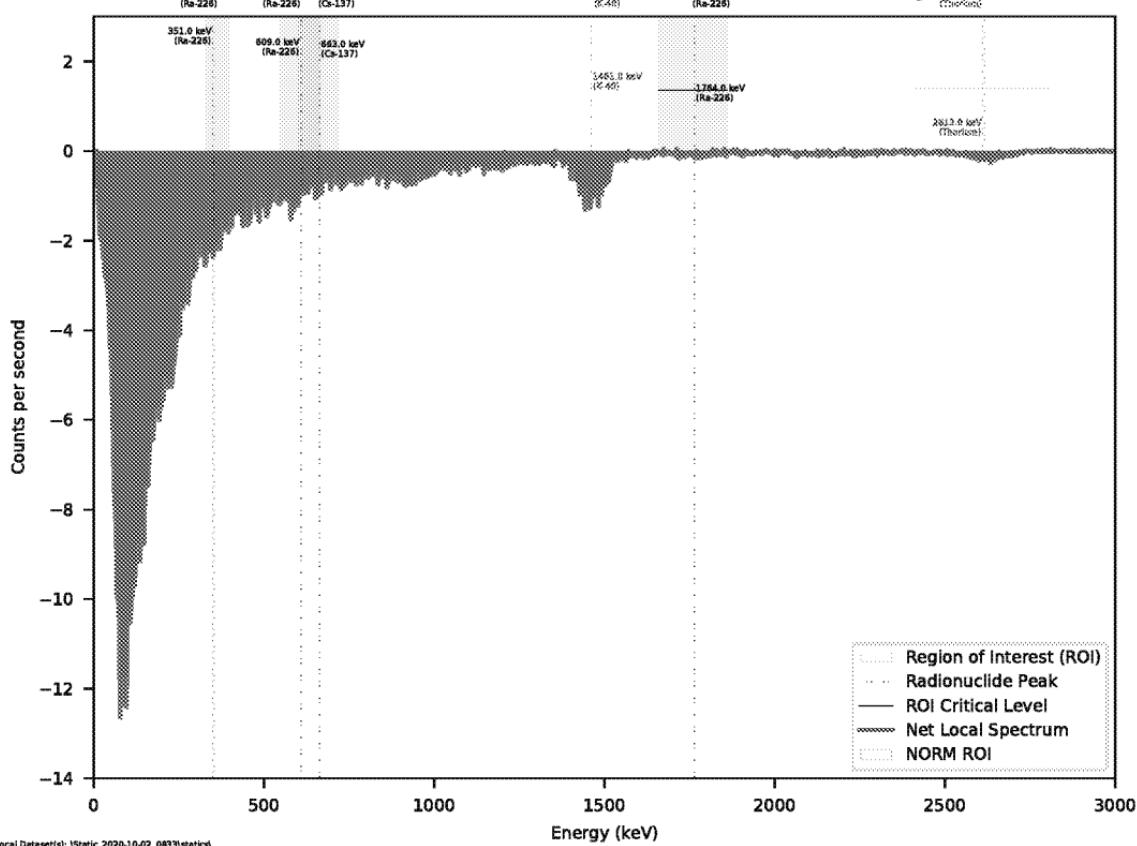
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ED_006360A_00000406-00038

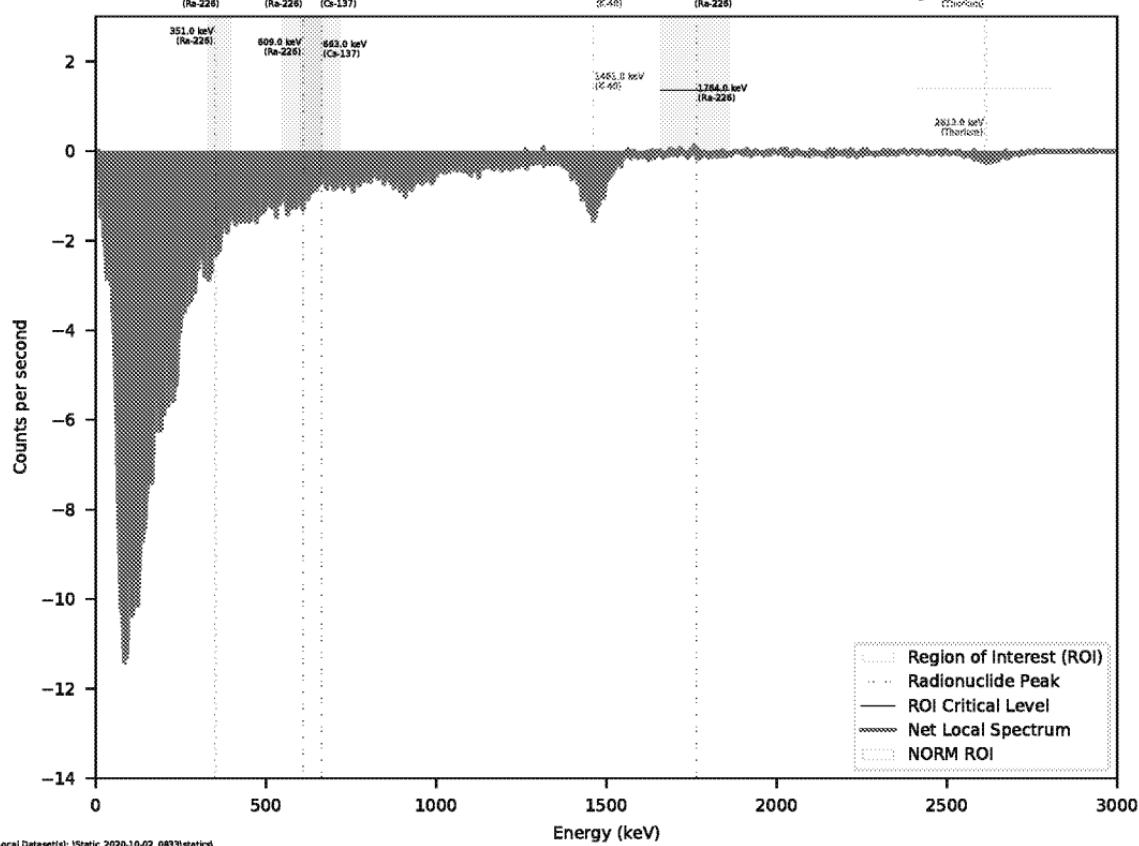
Net Gamma Spectrum, Static Location: 26

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Net Gamma Spectrum, Static Location: 27

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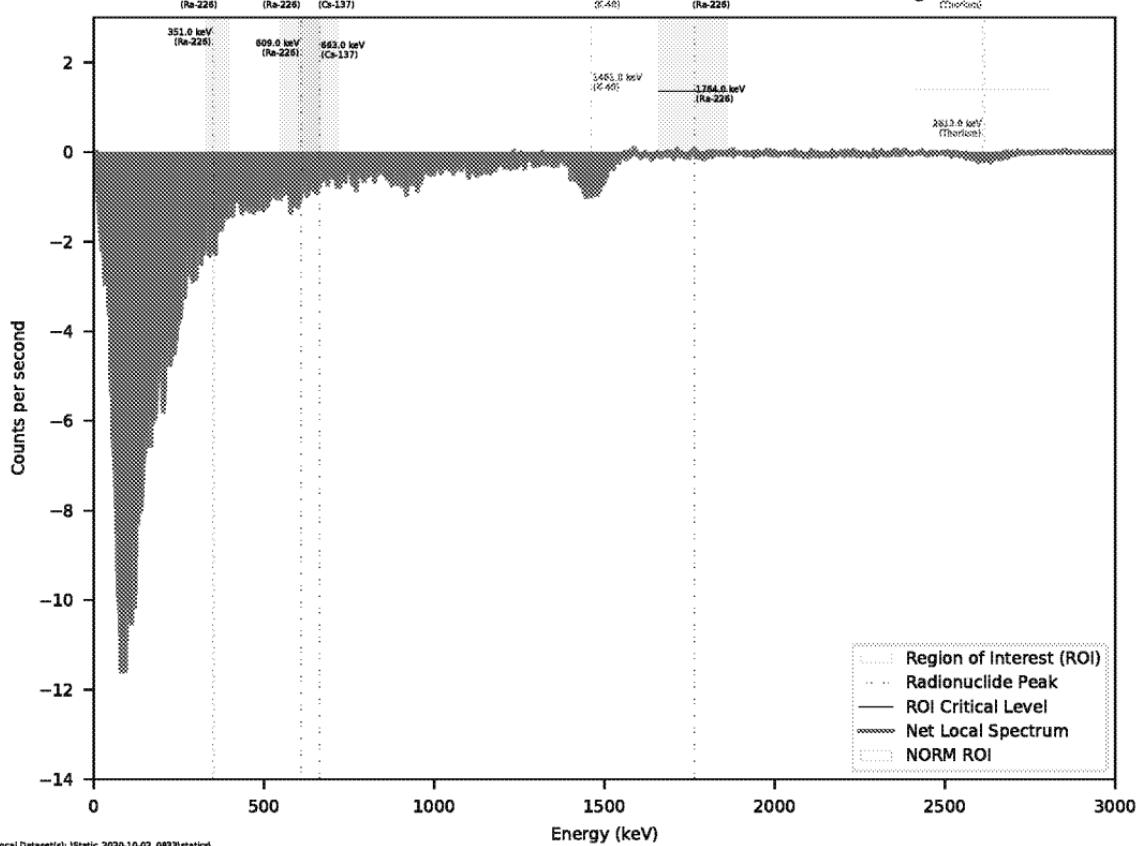
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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000406-00040

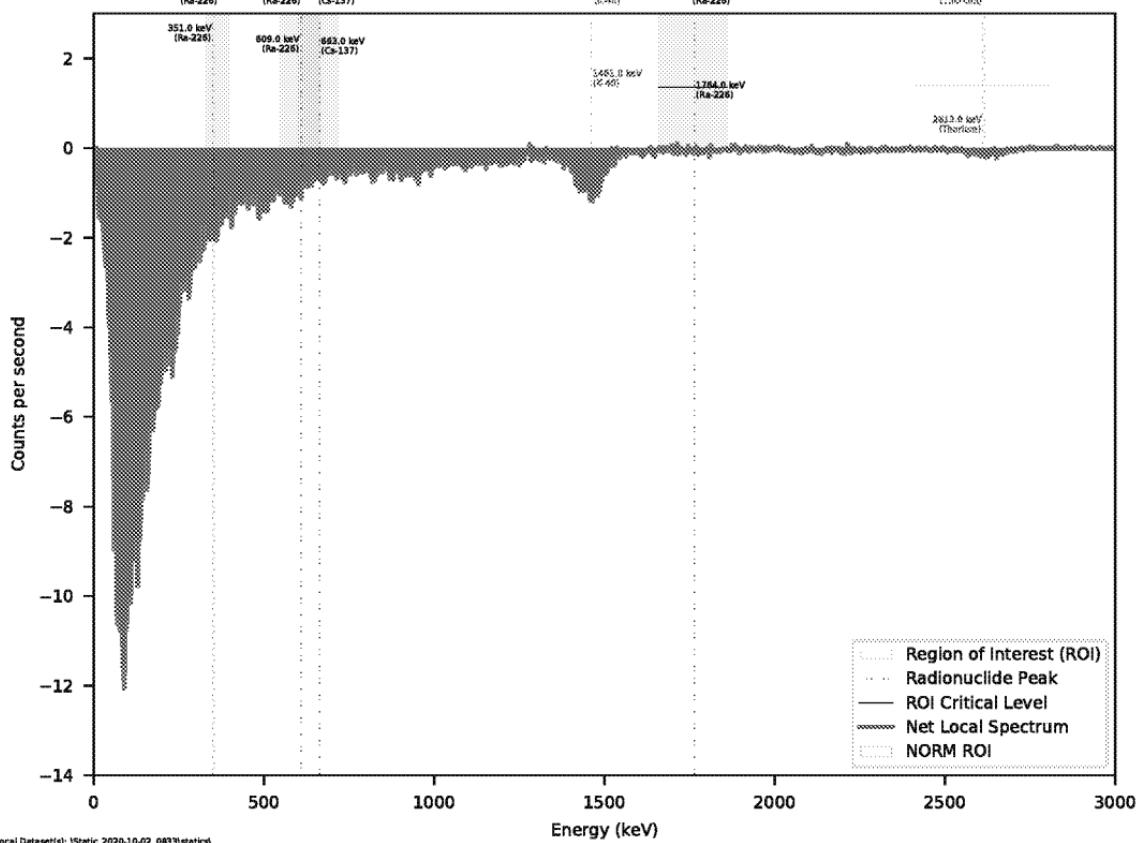
Net Gamma Spectrum, Static Location: 28

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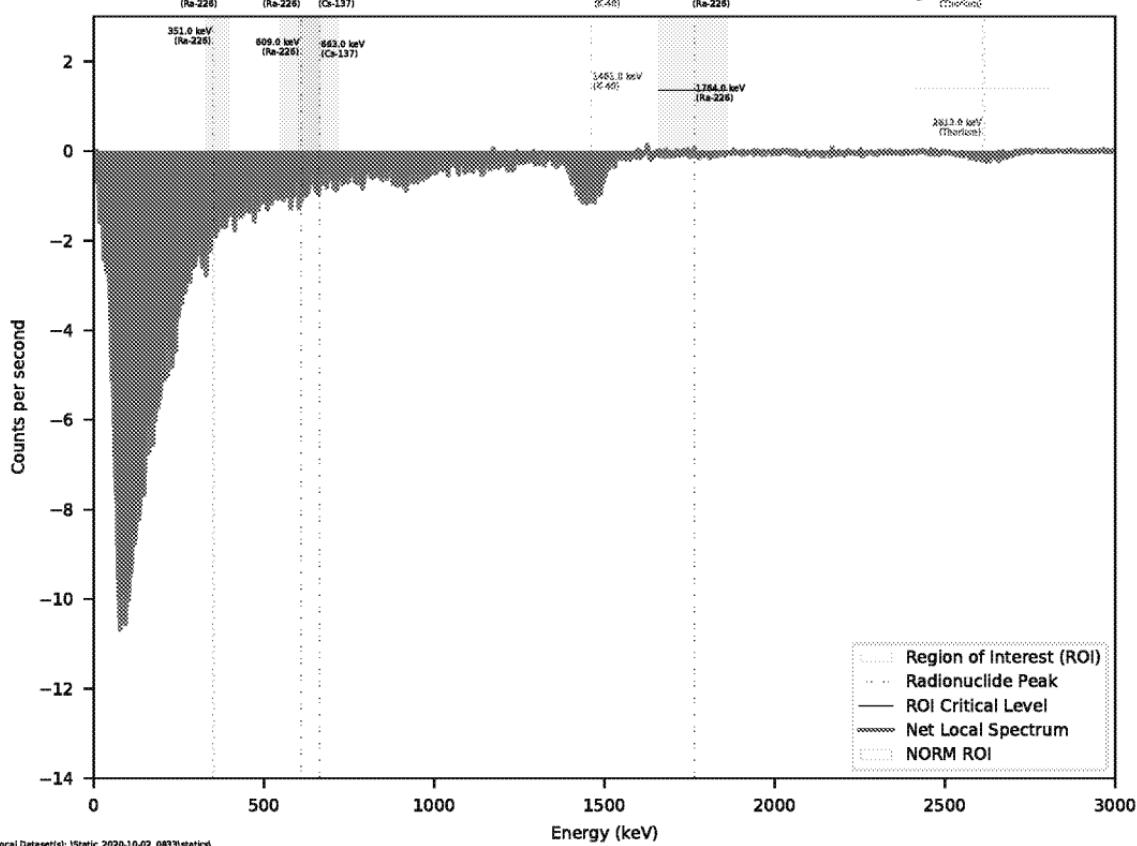
Net Gamma Spectrum, Static Location: 29

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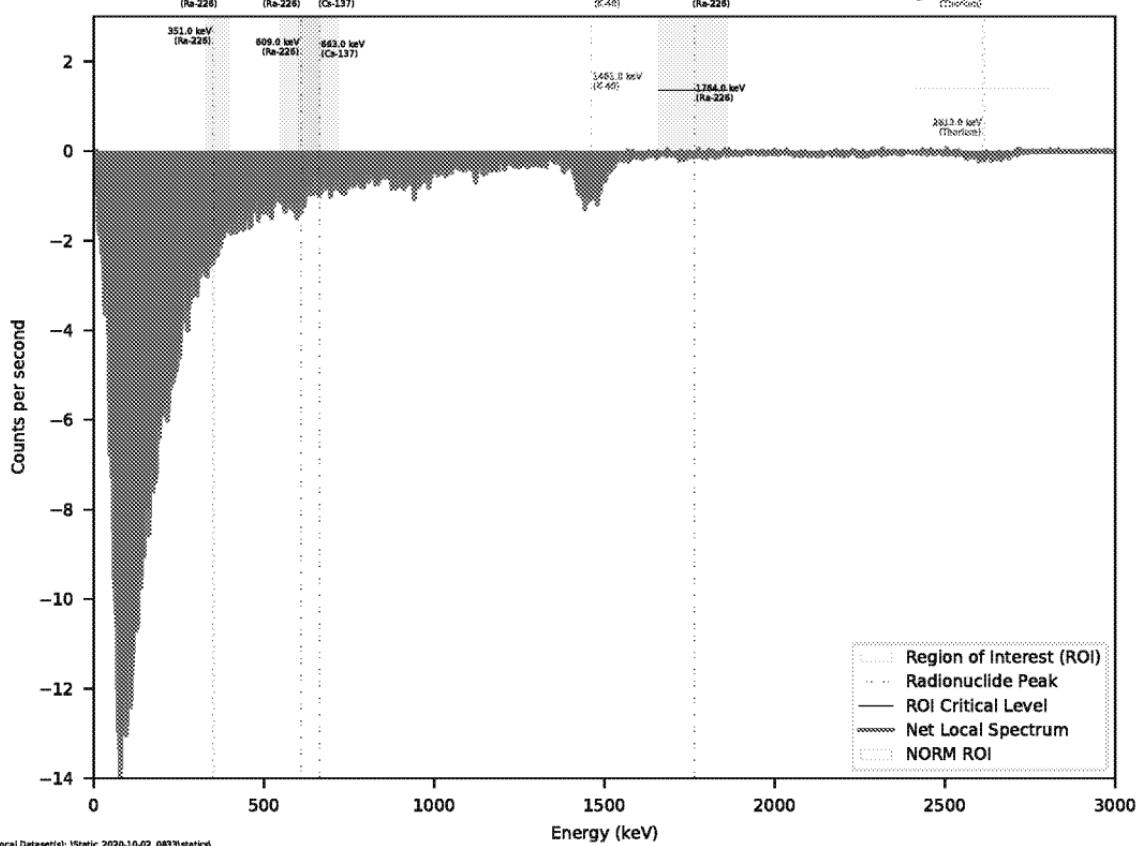
Net Gamma Spectrum, Static Location: 30

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Net Gamma Spectrum, Static Location: 31

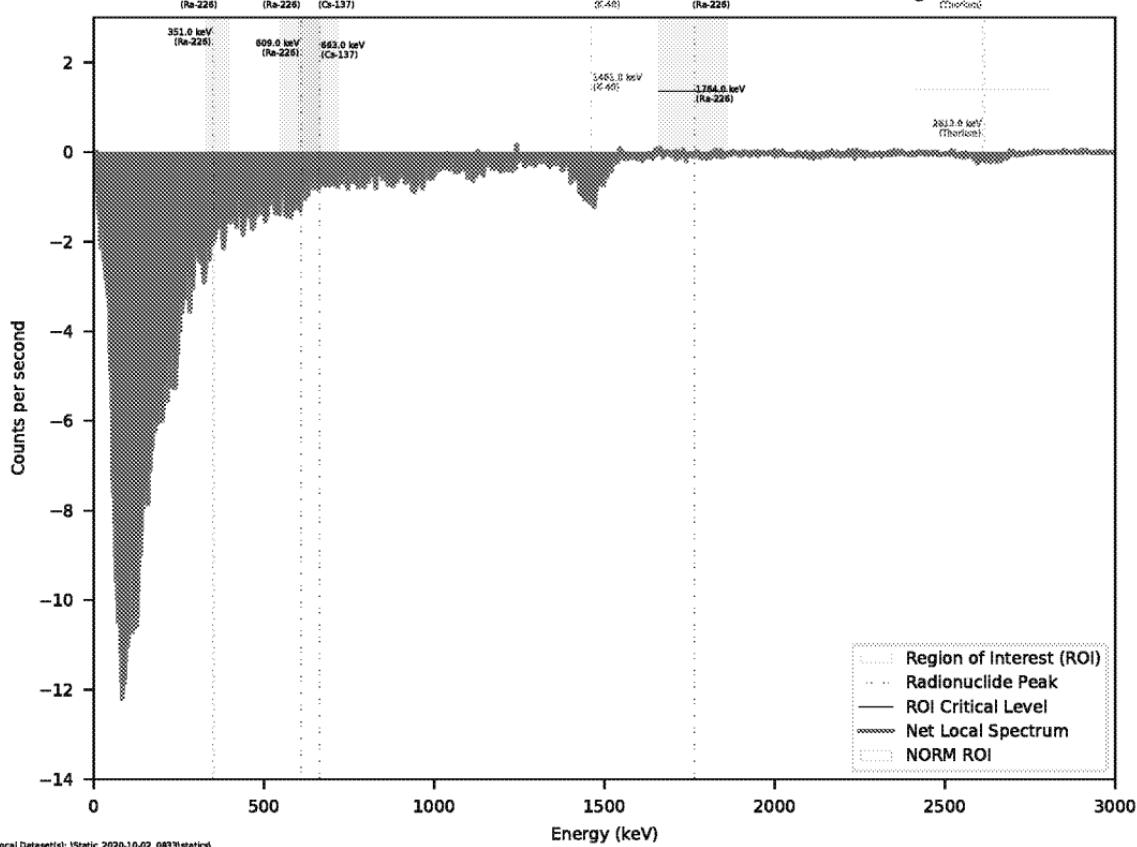
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ED_006360A_00000406-00044

Net Gamma Spectrum, Static Location: 32

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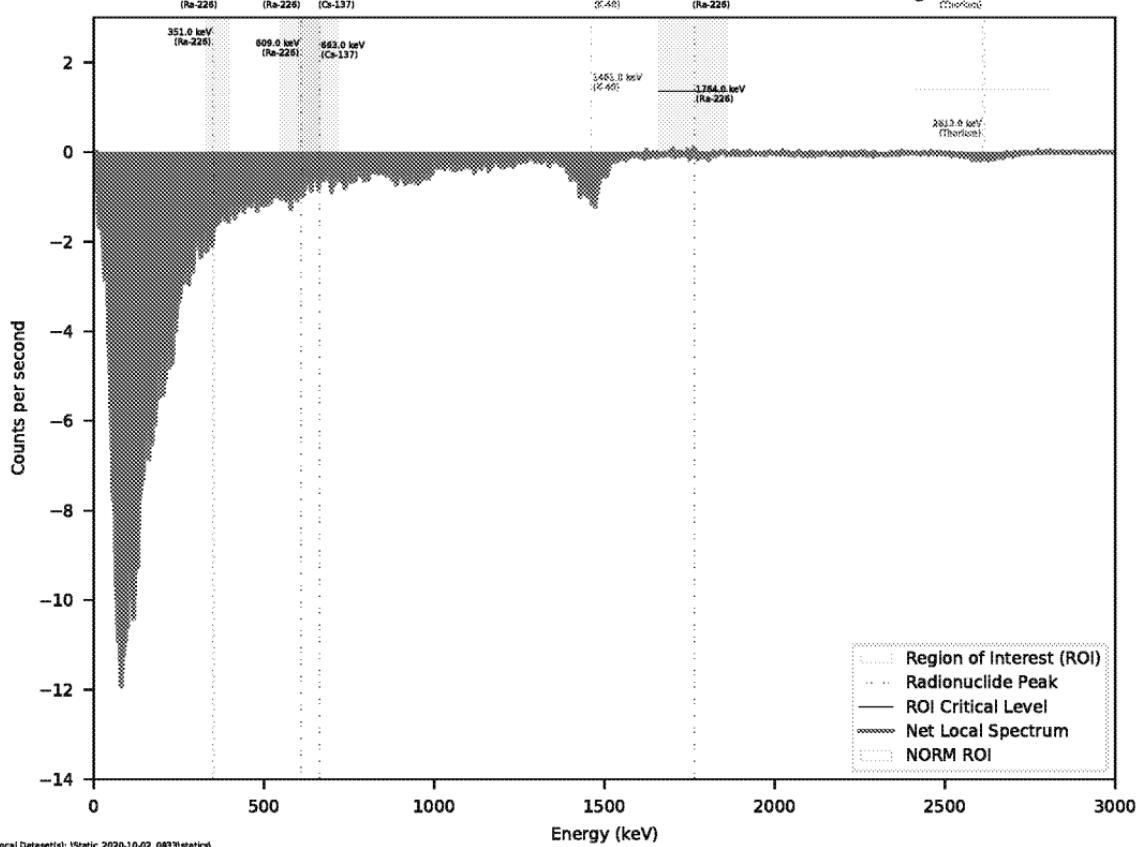
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ED_006360A_00000406-00045

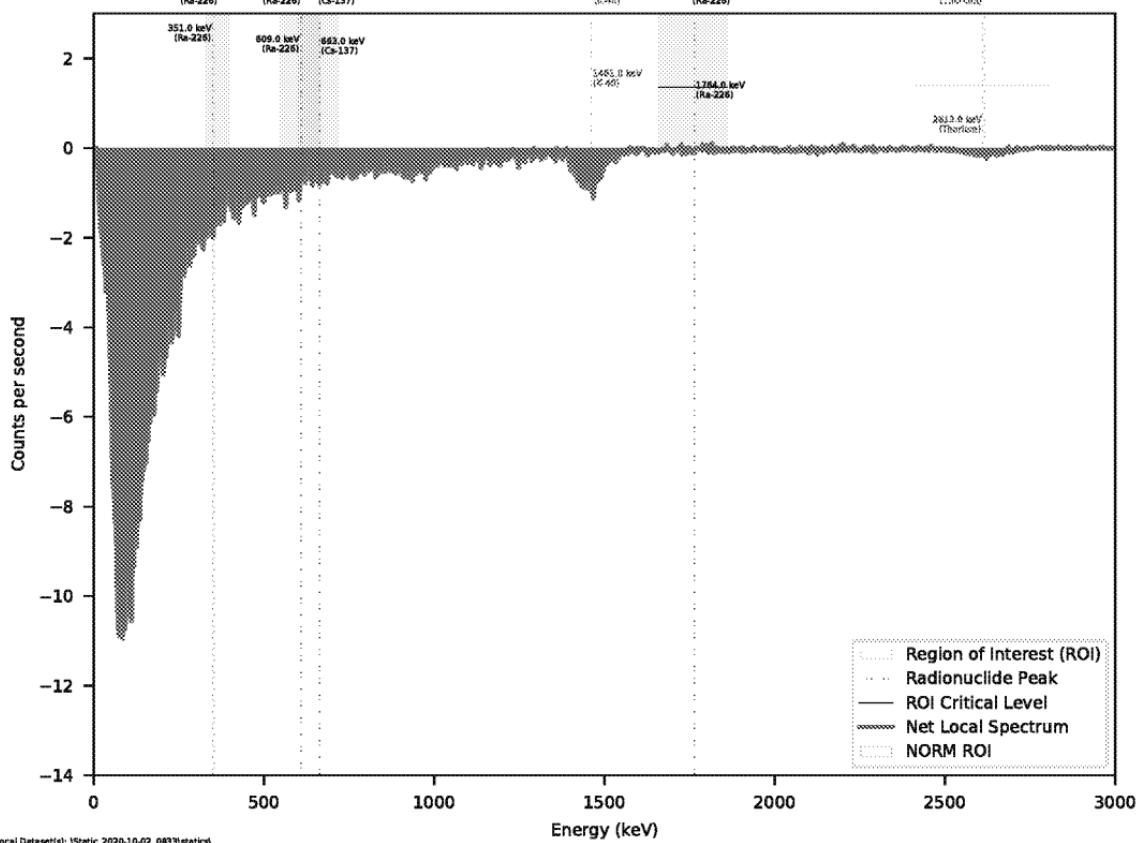
Net Gamma Spectrum, Static Location: 33

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Net Gamma Spectrum, Static Location: 34

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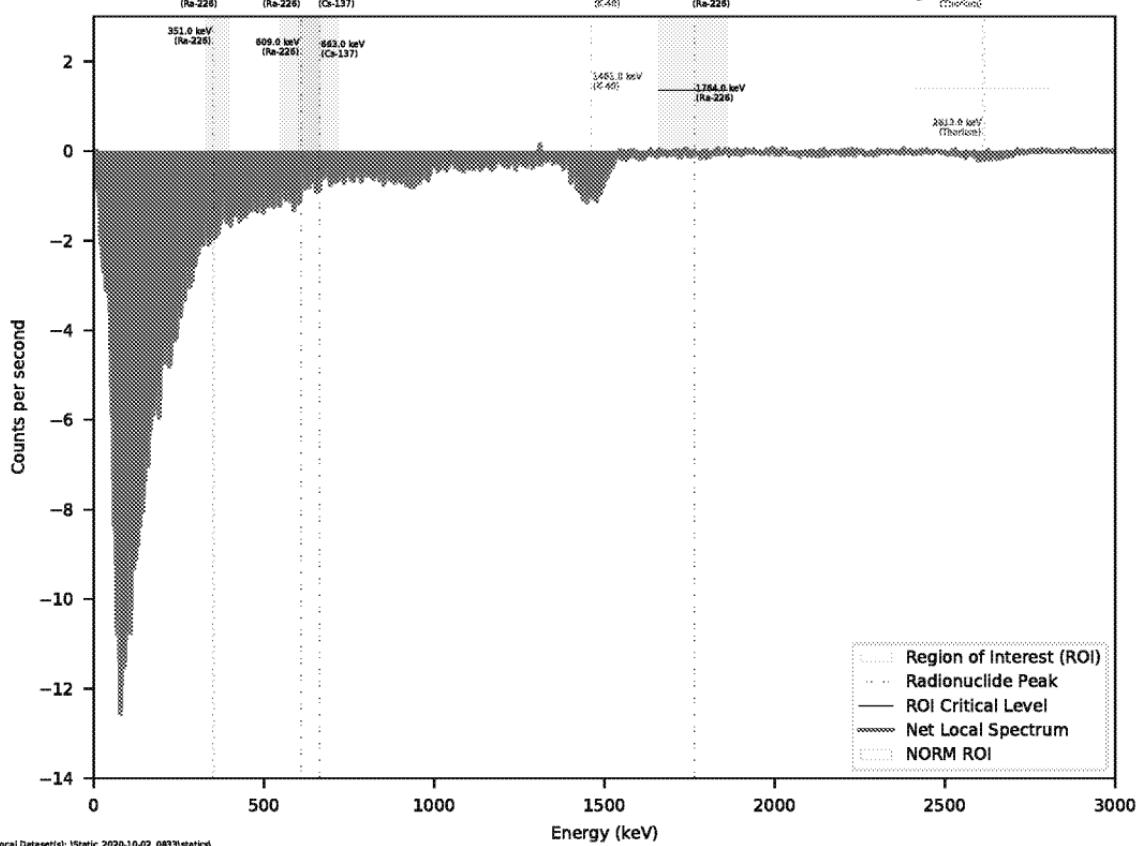
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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000406-00047

Net Gamma Spectrum, Static Location: 35

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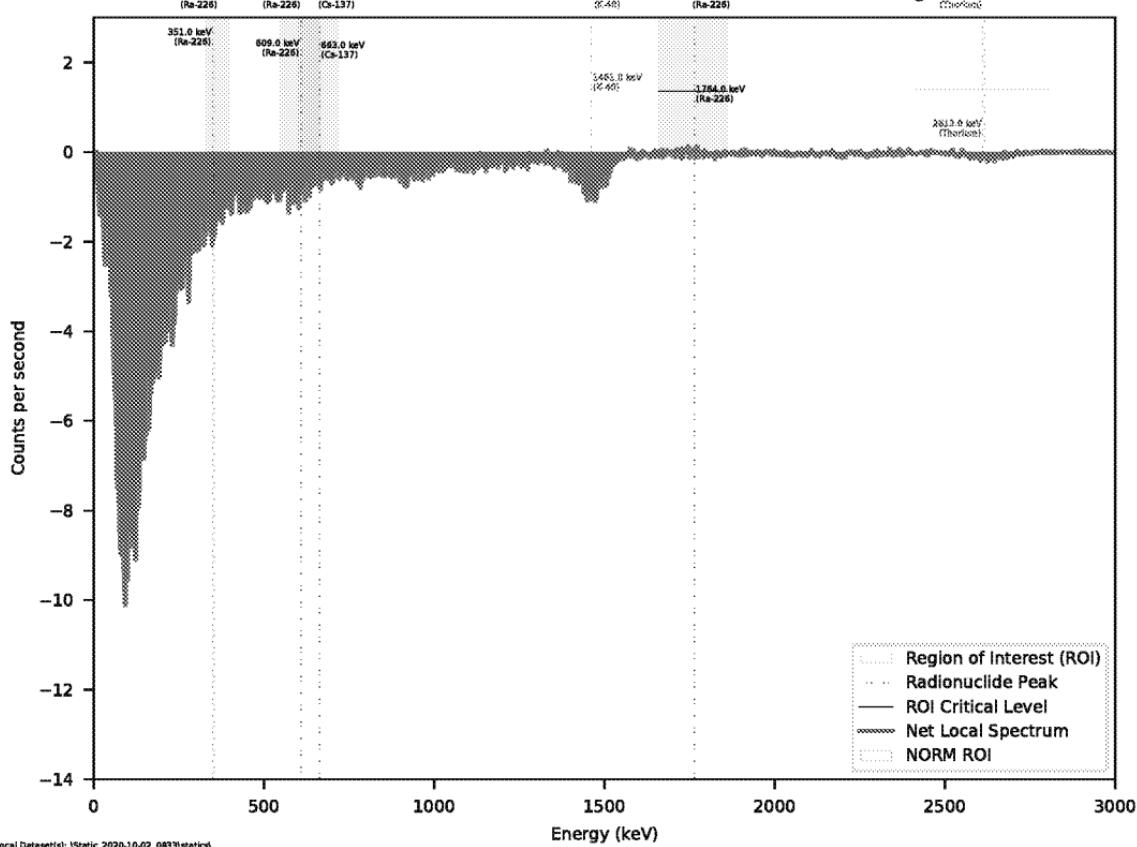
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ED_006360A_00000406-00048

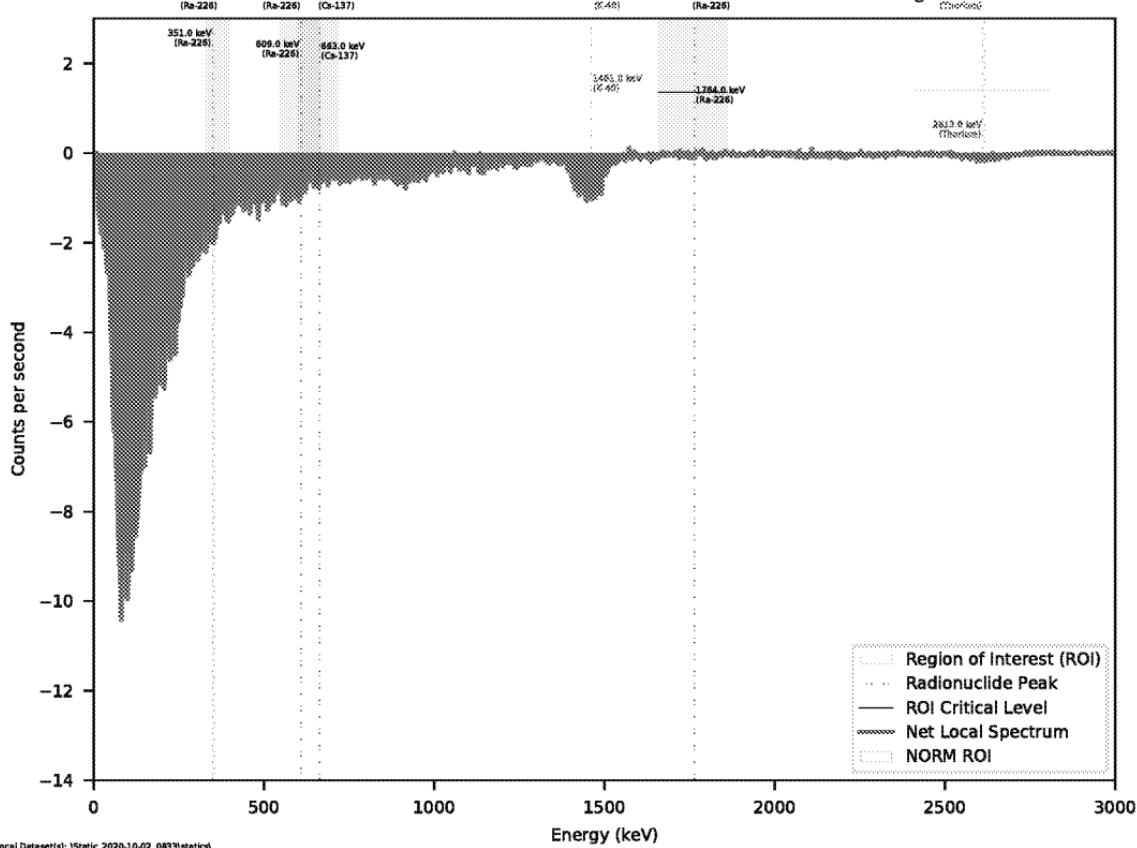
Net Gamma Spectrum, Static Location: 36

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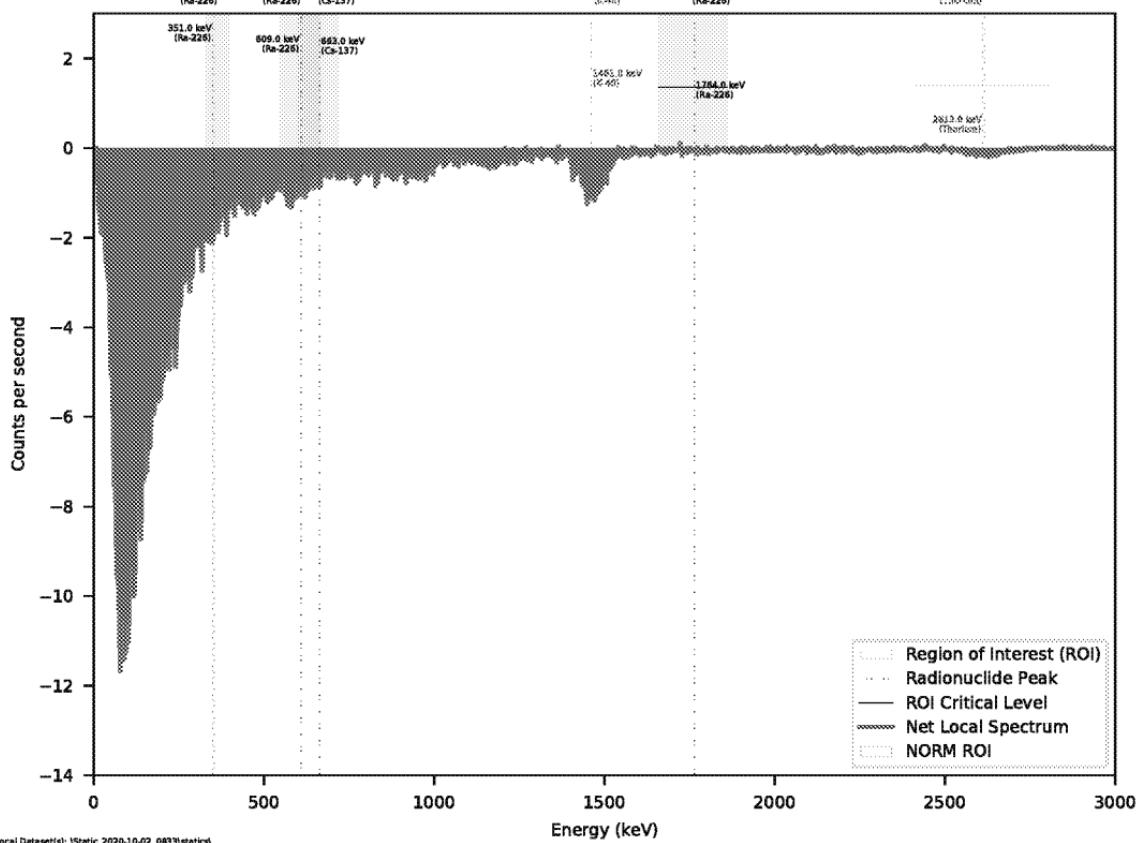
Net Gamma Spectrum, Static Location: 37

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Net Gamma Spectrum, Static Location: 38

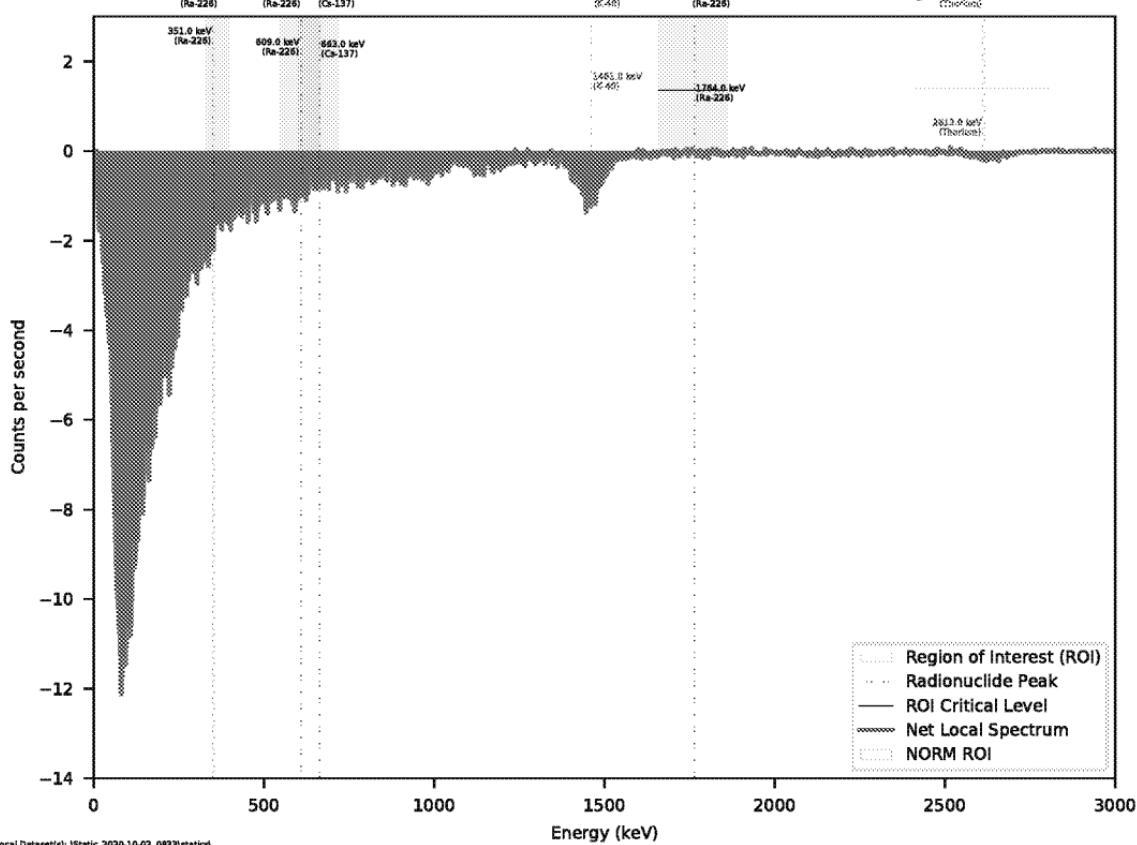
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ED_006360A_00000406-00051

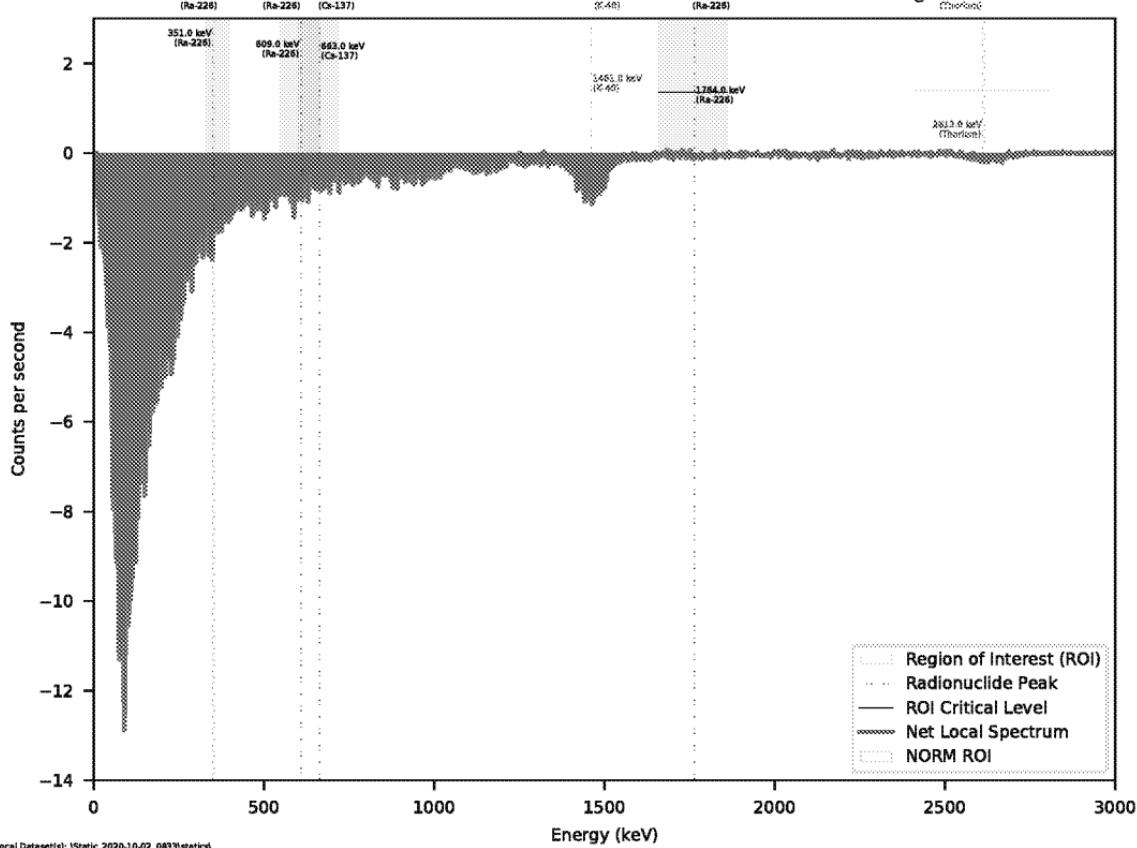
Net Gamma Spectrum, Static Location: 39

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Net Gamma Spectrum, Static Location: 40

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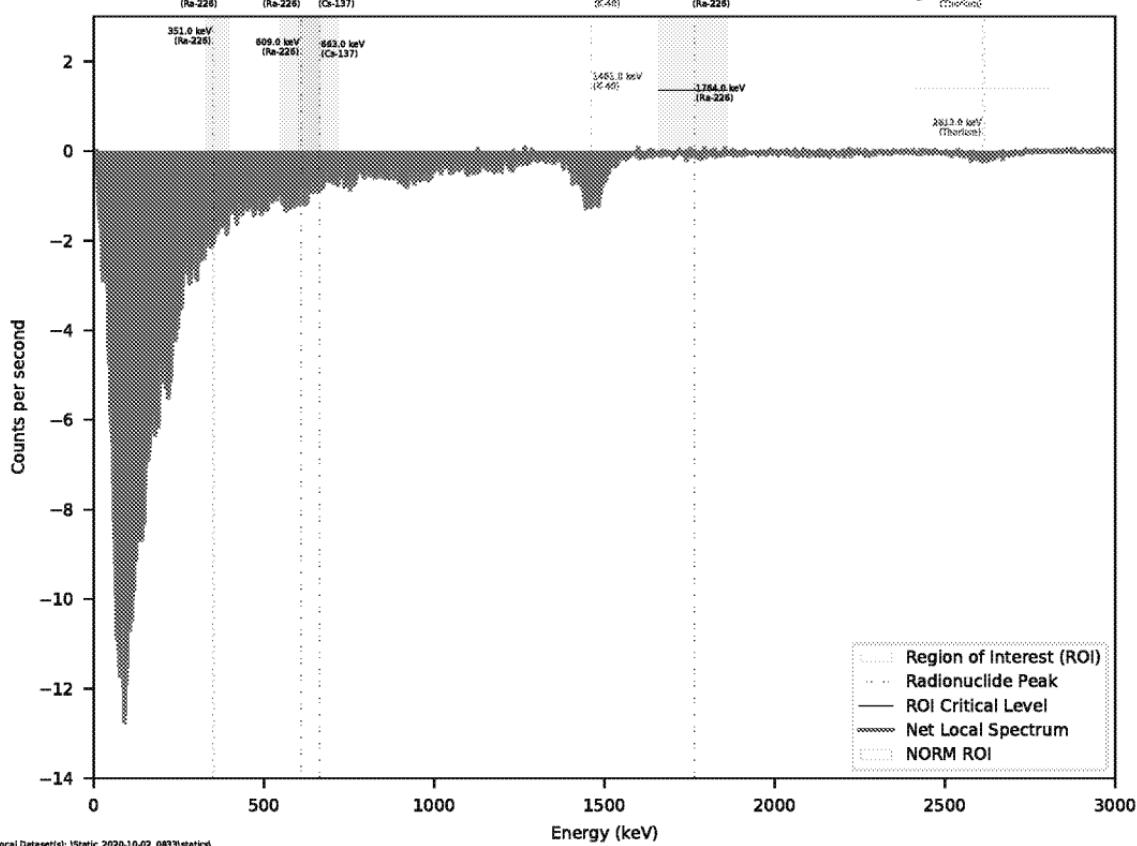


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Background Dataset(s): RSII_SoilRBA_Static.csv

ED_006360A_00000406-00053

Net Gamma Spectrum, Static Location: 41

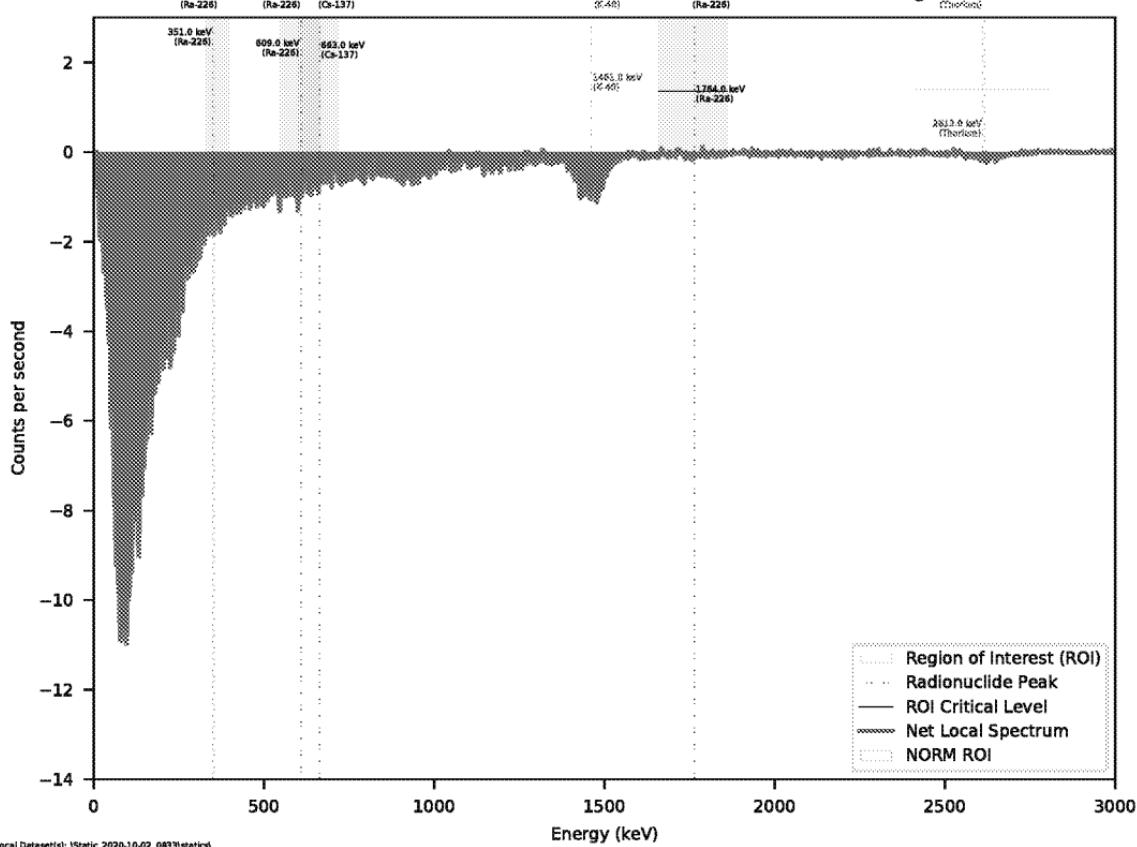
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ED_006360A_00000406-00054

Net Gamma Spectrum, Static Location: 42

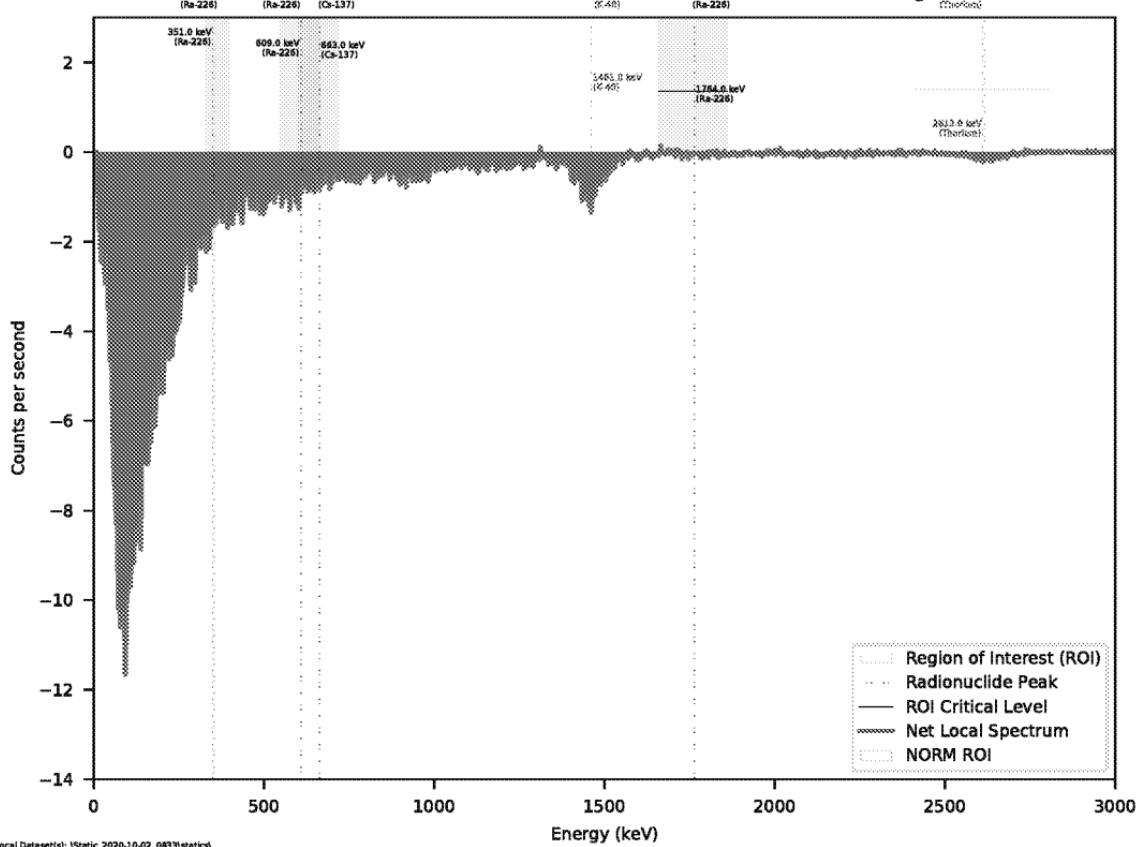
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ED_006360A_00000406-00055

Net Gamma Spectrum, Static Location: 43

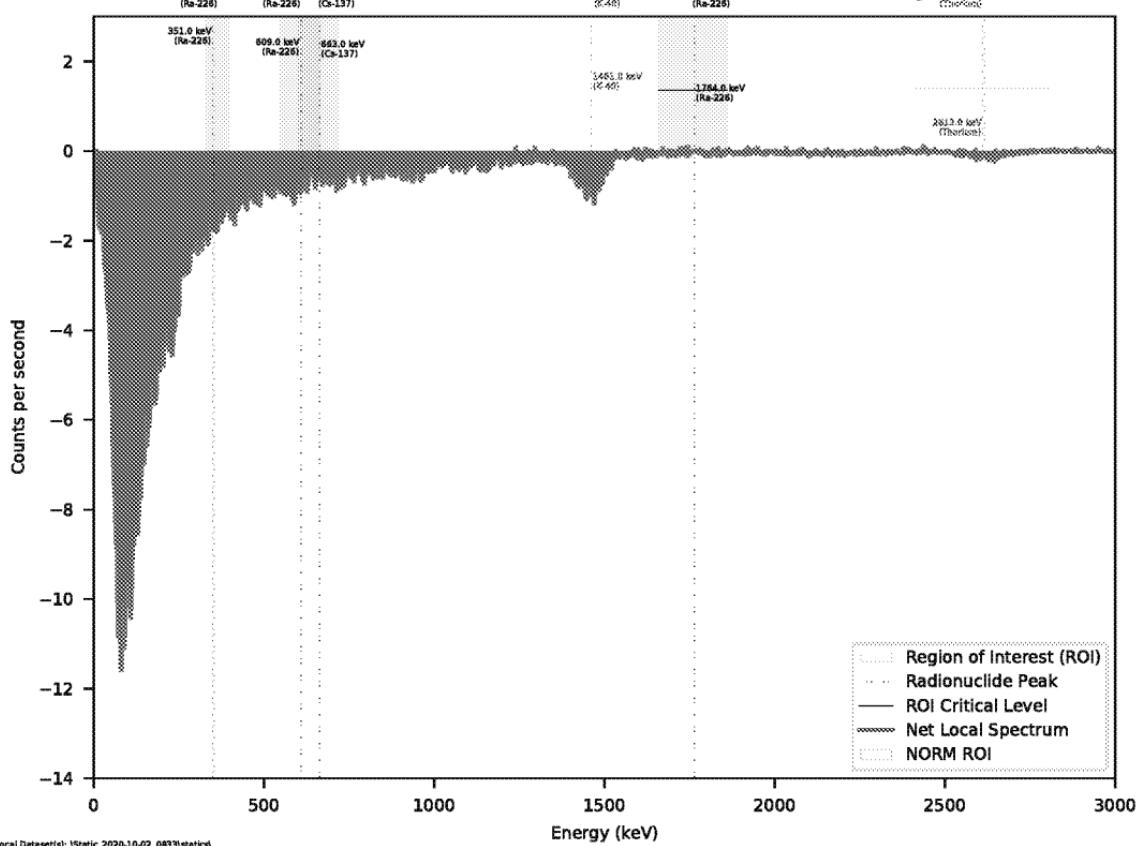
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ED_006360A_00000406-00056

Net Gamma Spectrum, Static Location: 44

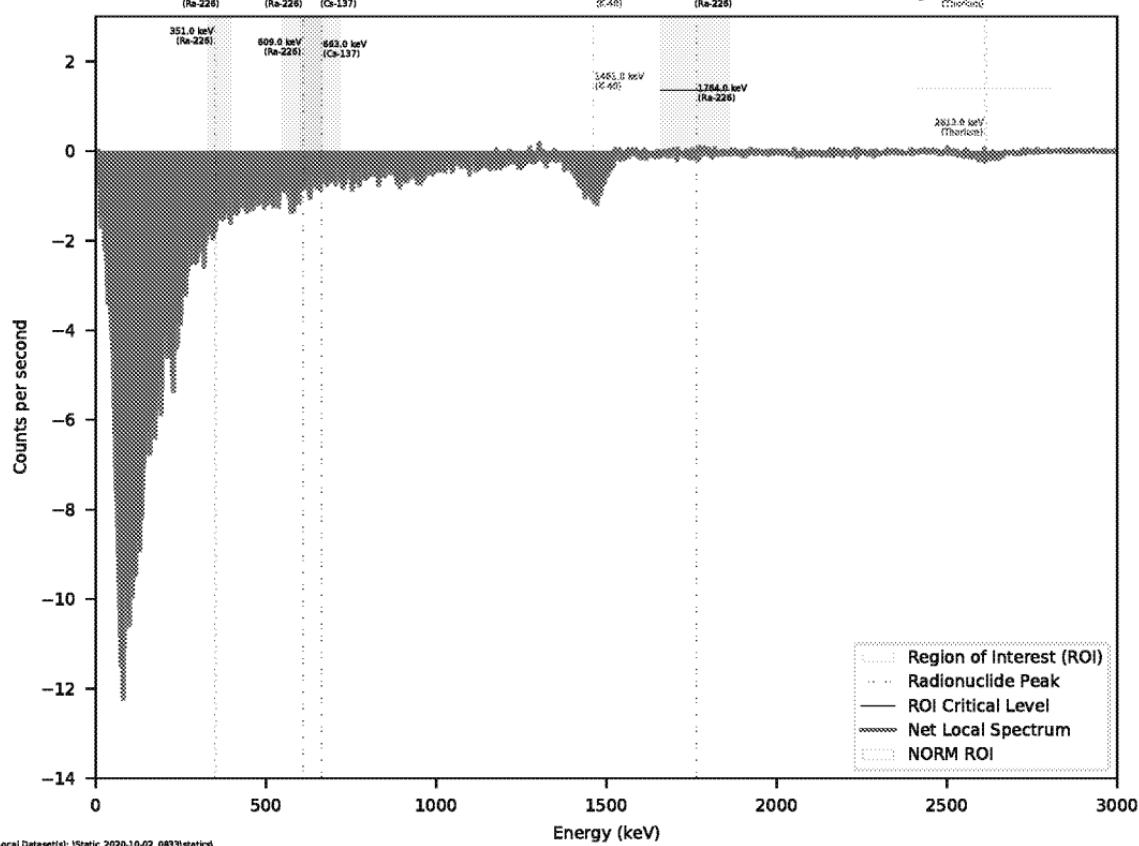
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ED_006360A_00000406-00057

Net Gamma Spectrum, Static Location: 45

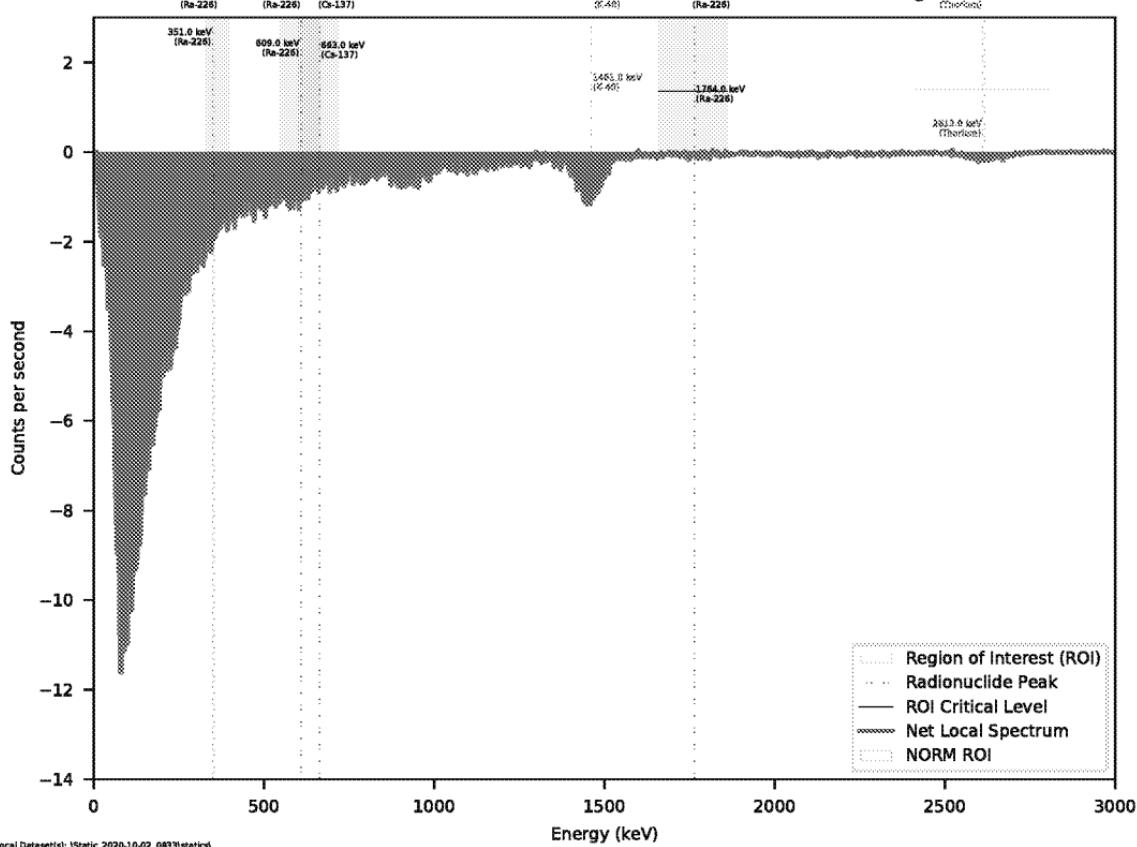
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ED_006360A_00000406-00058

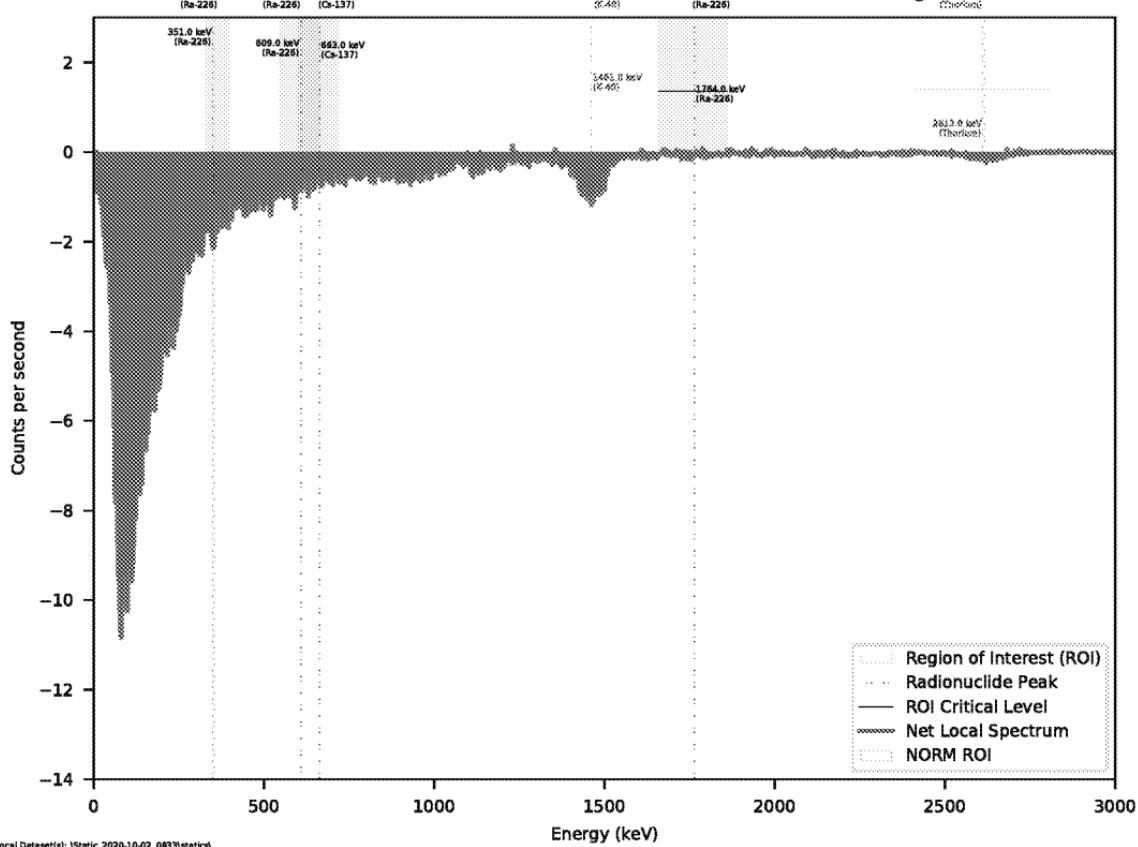
Net Gamma Spectrum, Static Location: 46

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Net Gamma Spectrum, Static Location: 47

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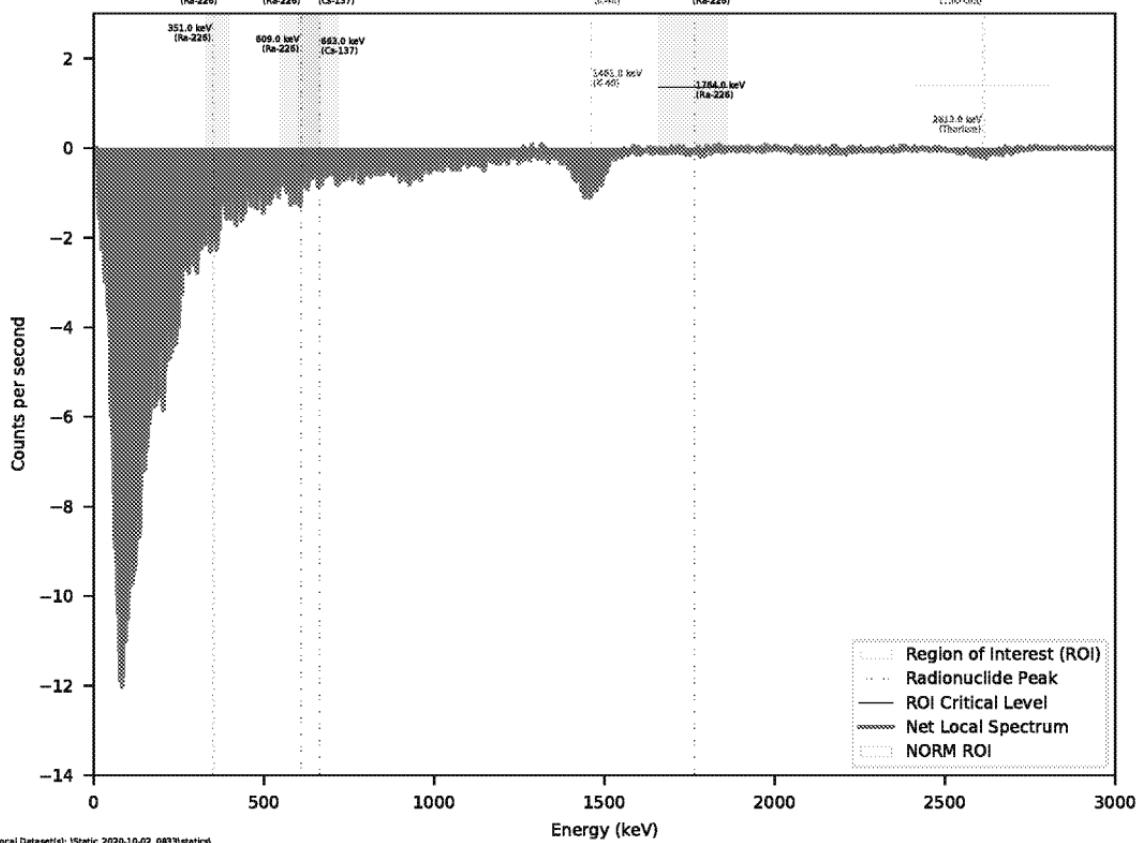
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Background Dataset(s): RSII_SoI/RB_A_Static.csv

Local Coordinates (Longitude, Latitude): -122.3656476736111, 37.72207970000001

ED_006360A_00000406-00060

Net Gamma Spectrum, Static Location: 48

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Environment Testing
America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-39748-1
Laboratory Sample Delivery Group: GJ46599787
Client Project/Site: HPNS-Parcel G 501197
Revision: 3

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
4/7/2021 10:15:21 AM

Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Tracer Carrier Summary	42

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Job ID: 160-39748-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-39748-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- Added Pa234 to gamma analyte list.

Revision 2- Incorrect GFPC blue monthly background, correct background and results reported in revision.

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Job ID: 160-39748-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Revision 3- Additional information requested in case narrative for total strontium

RECEIPT

The samples were received on 10/05/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.7 C.

TOTAL BETA STRONTIUM (GFPC)

Samples HPPG-ESU-TU153A-001 (160-39748-1), HPPG-ESU-TU153A-002 (160-39748-2), HPPG-ESU-TU153A-003 (160-39748-3), HPPG-ESU-TU153A-004 (160-39748-4), HPPG-ESU-TU153A-005 (160-39748-5), HPPG-ESU-TU153A-006 (160-39748-6), HPPG-ESU-TU153A-007 (160-39748-7), HPPG-ESU-TU153A-008 (160-39748-8), HPPG-ESU-TU153A-009 (160-39748-9), HPPG-ESU-TU153A-010 (160-39748-10), HPPG-ESU-TU153A-011 (160-39748-11), HPPG-ESU-TU153A-012 (160-39748-12), HPPG-ESU-TU153A-013 (160-39748-13), HPPG-ESU-TU153A-014 (160-39748-14), HPPG-ESU-TU153A-015 (160-39748-15), HPPG-ESU-TU153A-016 (160-39748-16), HPPG-ESU-TU153A-017 (160-39748-17), HPPG-ESU-TU153A-018 (160-39748-18), HPPG-ESU-TU153A-019 (160-39748-19), HPPG-ESU-TU153A-020 (160-39748-20), HPPG-ESU-TU153A-021 (160-39748-21), HPPG-ESU-TU153A-022 (160-39748-22), HPPG-ESU-TU153A-023 (160-39748-23), HPPG-ESU-TU153A-024 (160-39748-24), HPPG-ESU-TU153A-025 (160-39748-25), HPPG-F-003 (160-39748-26) and HPPG-F-004 (160-39748-27) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 10/07/2020 and 10/09/2020, prepared on 10/19/2020 and 10/20/2020 and analyzed on 11/09/2020.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP : HPPG-ESU-TU153A-001 (160-39748-1), HPPG-ESU-TU153A-002 (160-39748-2), HPPG-ESU-TU153A-003 (160-39748-3), HPPG-ESU-TU153A-004 (160-39748-4), HPPG-ESU-TU153A-005 (160-39748-5), HPPG-ESU-TU153A-006 (160-39748-6), HPPG-ESU-TU153A-007 (160-39748-7), HPPG-ESU-TU153A-008 (160-39748-8), HPPG-ESU-TU153A-009 (160-39748-9), HPPG-ESU-TU153A-010 (160-39748-10), HPPG-ESU-TU153A-011 (160-39748-11), HPPG-ESU-TU153A-012 (160-39748-12), HPPG-ESU-TU153A-013 (160-39748-13), HPPG-ESU-TU153A-014 (160-39748-14), HPPG-ESU-TU153A-015 (160-39748-15), HPPG-ESU-TU153A-016 (160-39748-16), HPPG-ESU-TU153A-017 (160-39748-17), HPPG-ESU-TU153A-018 (160-39748-18), HPPG-ESU-TU153A-019 (160-39748-19), HPPG-ESU-TU153A-020 (160-39748-20), HPPG-ESU-TU153A-021 (160-39748-21) and (160-39748-A-1-A DU).

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP: HPPG-ESU-TU153A-022 (160-39748-22), HPPG-ESU-TU153A-023 (160-39748-23), HPPG-ESU-TU153A-024 (160-39748-24), HPPG-ESU-TU153A-025 (160-39748-25), HPPG-F-003 (160-39748-26), HPPG-F-004 (160-39748-27) and (160-39748-A-22-A DU).

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU. This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.
HPPG-ESU-TU153A-001 (160-39748-1)

The closing bracketing daily background failed for detector, however passed the following day. Original results will be reported.
HPPG-ESU-TU153A-015 (160-39748-15)

The method blank (MB) Z-score associated is within limits and is located in the level IV raw data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-ESU-TU153A-001 (160-39748-1), HPPG-ESU-TU153A-002 (160-39748-2), HPPG-ESU-TU153A-003 (160-39748-3), HPPG-ESU-TU153A-004 (160-39748-4), HPPG-ESU-TU153A-005 (160-39748-5), HPPG-ESU-TU153A-006 (160-39748-6), HPPG-ESU-TU153A-007 (160-39748-7), HPPG-ESU-TU153A-008 (160-39748-8), HPPG-ESU-TU153A-009 (160-39748-9), HPPG-ESU-TU153A-010 (160-39748-10), HPPG-ESU-TU153A-011 (160-39748-11), HPPG-ESU-TU153A-012 (160-39748-12), HPPG-ESU-TU153A-013 (160-39748-13), HPPG-ESU-TU153A-014 (160-39748-14), HPPG-ESU-TU153A-015 (160-39748-15), HPPG-ESU-TU153A-016 (160-39748-16), HPPG-ESU-TU153A-017 (160-39748-17), HPPG-ESU-TU153A-018 (160-39748-18), HPPG-ESU-TU153A-019 (160-39748-19), HPPG-ESU-TU153A-020 (160-39748-20), HPPG-ESU-TU153A-021 (160-39748-21),

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Job ID: 160-39748-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

HPPG-ESU-TU153A-022 (160-39748-22), HPPG-ESU-TU153A-023 (160-39748-23), HPPG-ESU-TU153A-024 (160-39748-24), HPPG-ESU-TU153A-025 (160-39748-25), HPPG-F-003 (160-39748-26) and HPPG-F-004 (160-39748-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/07/2020 and 10/09/2020, prepared on 10/13/2020 and 10/14/2020 and analyzed on 11/08/2020 and 11/11/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The method blank (MB) Z-score associated with Prep Batch 160-485412 is within limits and is located in the level IV raw data. (MB 160-485412/1-A)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.
HPPG-ESU-TU153A-007 (160-39748-7)

The radium detection goal of 0.2 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.
HPPG-ESU-TU153A-011 (160-39748-11) and (160-39748-A-20-E DU)

The method blank (MB) z-score associated with Prep Batch 160-485694 is within limits and is stored in the level IV raw data. (MB 160-485694/1-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

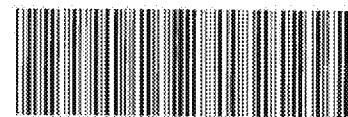
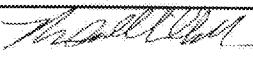
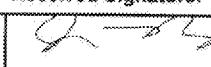
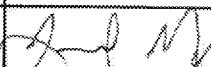
Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez

CHAIN OF CUSTODY

Ref. Document # 501197RSY-003

Page 1 of 4

<p>Project Number: 501197</p> <p>Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action</p> <p>Project Location: San Francisco, CA</p> <p>Purchase Order #: 1159058</p> <p>Shipment/Pickup Date: 10/2/2020</p> <p>Waybill Number: 4457 0225 2094</p> <p>Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046</p>				<p>Analysis Requested</p>				 160-39748 Chain of Custody			
<p>Lab Contact Name/ph #:</p> <p>Rhoeda Ridenbower (314)298-8566</p>				<p>Total Strontium (EPA 805 M0D)</p> <p>Gamma Spec (EPA 805 M0D)</p> <p>2-day In Growth Screening</p>		<p>Dose Rate uR/Hr</p>		<p>Evidence Bag ID</p>		<p>Comment</p>	
				# of Containers	Preservatives (water)	Preservatives (soil)	Container Type				
Sample ID	Date	Time	Method	Matrix							
HPPG-ESU-TU153A-001	10/1/2020	13:05	G	SO	1	16 oz. plastic jar	X	X	X		5
HPPG-ESU-TU153A-002	10/1/2020	13:25	G	SO	1	16 oz. plastic jar	X	X	X		4
HPPG-ESU-TU153A-003	10/1/2020	14:07	G	SO	1	16 oz. plastic jar	X	X	X		4
HPPG-ESU-TU153A-004	10/1/2020	13:50	G	SO	1	16 oz. plastic jar	X	X	X		4
HPPG-ESU-TU153A-005	10/1/2020	14:03	G	SO	1	16 oz. plastic jar	X	X	X		5
HPPG-ESU-TU153A-006	10/1/2020	14:31	G	SO	1	16 oz. plastic jar	X	X	X		4
HPPG-ESU-TU153A-007	10/1/2020	14:37	G	SO	1	16 oz. plastic jar	X	X	X		4
HPPG-ESU-TU153A-008	10/1/2020	14:42	G	SO	1	16 oz. plastic jar	X	X	X		4
<p>Special Instructions:</p> <p style="text-align: center;">21 day Ingrowth results only Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g</p>											
<p>Turnaround Time: 3-day <input type="checkbox"/> 10-Day <input type="checkbox"/> 28-day <input type="checkbox"/> Other <input type="checkbox"/></p>				<p>Level of QC Required: I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> Project Specific</p>							
<p>Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening</p>											
<p>Relinquished By:</p>		<p>Relinquisher Signature:</p>		<p>Relinquish Date Time:</p>		<p>Received By:</p>		<p>Received Signature:</p>		<p>Receive Date Time:</p>	
Locked Storage (RKilpack)				10/02/2020 13:01		Joaquin Ramirez				10/02/2020 13:01	
Locked Storage (RKilpack)				10/02/2020 13:01		Joaquin Ramirez				10/02/2020 13:01	
Joaquin Ramirez				10/02/2020 13:18		SHIPPEDTOLAB				(10/02/2020 0822)	

*** Last 3 transfers shown above - Complete list of transfers on last page ***



ED_006360A_00000406-00067



APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0260
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Muri
Sidney Vernon

CHAIN OF CUSTODY

Ref. Document # 501197RSY-003

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						Project Number: 501197		Analysis Requested								
						Hunters Point Naval Shipyard, Parcel G Remedial Action										
						Project Location: San Francisco, CA										
						Purchase Order #: 1159058										
						Shipment/Pickup Date: 10/2/2020										
						Waybill Number: 4957 0325 2034										
						Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046										
						Lab Contact Name/ph #										
						Rhoeda Ridenbower (314)298-8566										
														Dose Rate uR/Hr	Evidence Bag ID	Comment
Collection Information																
Sample ID				Date		Time		Preservatives (water)								
				HPPG-ESU-TU153A-009		10/1/2020		Preservatives (soil)								
				HPPG-ESU-TU153A-010		15:07		Container Type								
				HPPG-ESU-TU153A-011		10/1/2020		Matrix								
				HPPG-ESU-TU153A-012		15:13		# of Containers								
				HPPG-ESU-TU153A-013		10/1/2020		16 oz. plastic jar								
				HPPG-ESU-TU153A-014		15:20		Day in Ground Sample (EPA 905 M0D)								
				HPPG-ESU-TU153A-015		10/1/2020		Total Sample (EPA 905 M0D - F-M121)								
				HPPG-ESU-TU153A-016		10:45		Comments								
				HPPG-ESU-TU153A-017		10:50		Dose Rate uR/Hr								
				HPPG-ESU-TU153A-018		10:55		Evidence Bag ID								
				HPPG-ESU-TU153A-019		11:00		Comment								
				HPPG-ESU-TU153A-020		10/1/2020		Dose Rate uR/Hr								
				HPPG-ESU-TU153A-021		10:02		Evidence Bag ID								
				HPPG-ESU-TU153A-022		10:04		Comment								
				HPPG-ESU-TU153A-023		10:48		Dose Rate uR/Hr								
				HPPG-ESU-TU153A-024		10:53		Evidence Bag ID								
				HPPG-ESU-TU153A-025		10:10		Comment								



APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # 501197RSY-003

Page 3 of 4

Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

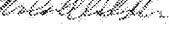
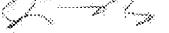
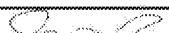
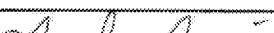
Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Murri
Sidney Vernon

				Project Number: 501197		Analysis Requested						Dose Rate uR/Hr	Evidence Bag ID	Comment				
				Hunters Point Naval Shipyard: Parcel G Remedial Action														
				Project Location: San Francisco, CA								Lab Contact Name/ph #	Rhoeda Ridenbower (314)298-8566	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046				
				Purchase Order #: 1159058														
Shipment/Pickup Date: 10/2/2020				Waybill Number: 4957 0225 2094														
				Lab Destination: day in ground gamma														
				Carry Spec (EPA 905 M05)														
				Total Shipment (EPA 905 M05)														
				Carry Spec (EPA 905 M05)														
				Carry Spec (EPA 905 M05)														
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				Carry Spec (EPA 905 M05)														
				Carry Spec (EPA 905 M05)														

All Transfers for COC 501197RSY-003

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Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/01/2020 17:47	Locked Storage (RKilpack)		10/01/2020 17:47
Locked Storage (RKilpack)		10/02/2020 13:01	Joaquin Ramirez		10/02/2020 13:01
Locked Storage (RKilpack)		10/02/2020 13:01	Joaquin Ramirez		10/02/2020 13:01
Joaquin Ramirez		10/02/2020 13:18	SHIPPEDTOLAB		10/02/2020 13:18

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-39748-1
SDG Number: GJ46599787**Login Number:** 39748**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, St. Louis

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-39748-1	HPPG-ESU-TU153A-001	Solid	10/01/20 13:05	10/05/20 08:22	
160-39748-2	HPPG-ESU-TU153A-002	Solid	10/01/20 13:25	10/05/20 08:22	
160-39748-3	HPPG-ESU-TU153A-003	Solid	10/01/20 14:07	10/05/20 08:22	
160-39748-4	HPPG-ESU-TU153A-004	Solid	10/01/20 13:50	10/05/20 08:22	
160-39748-5	HPPG-ESU-TU153A-005	Solid	10/01/20 14:03	10/05/20 08:22	
160-39748-6	HPPG-ESU-TU153A-006	Solid	10/01/20 14:31	10/05/20 08:22	
160-39748-7	HPPG-ESU-TU153A-007	Solid	10/01/20 14:37	10/05/20 08:22	
160-39748-8	HPPG-ESU-TU153A-008	Solid	10/01/20 14:42	10/05/20 08:22	
160-39748-9	HPPG-ESU-TU153A-009	Solid	10/01/20 15:07	10/05/20 08:22	
160-39748-10	HPPG-ESU-TU153A-010	Solid	10/01/20 15:13	10/05/20 08:22	
160-39748-11	HPPG-ESU-TU153A-011	Solid	10/01/20 15:20	10/05/20 08:22	
160-39748-12	HPPG-ESU-TU153A-012	Solid	10/01/20 15:45	10/05/20 08:22	
160-39748-13	HPPG-ESU-TU153A-013	Solid	10/01/20 15:50	10/05/20 08:22	
160-39748-14	HPPG-ESU-TU153A-014	Solid	10/01/20 16:00	10/05/20 08:22	
160-39748-15	HPPG-ESU-TU153A-015	Solid	10/01/20 16:02	10/05/20 08:22	
160-39748-16	HPPG-ESU-TU153A-016	Solid	10/01/20 16:04	10/05/20 08:22	
160-39748-17	HPPG-ESU-TU153A-017	Solid	10/01/20 15:48	10/05/20 08:22	
160-39748-18	HPPG-ESU-TU153A-018	Solid	10/01/20 15:35	10/05/20 08:22	
160-39748-19	HPPG-ESU-TU153A-019	Solid	10/01/20 16:10	10/05/20 08:22	
160-39748-20	HPPG-ESU-TU153A-020	Solid	10/01/20 16:01	10/05/20 08:22	
160-39748-21	HPPG-ESU-TU153A-021	Solid	10/01/20 15:55	10/05/20 08:22	
160-39748-22	HPPG-ESU-TU153A-022	Solid	10/01/20 16:20	10/05/20 08:22	
160-39748-23	HPPG-ESU-TU153A-023	Solid	10/01/20 16:15	10/05/20 08:22	
160-39748-24	HPPG-ESU-TU153A-024	Solid	10/01/20 16:23	10/05/20 08:22	
160-39748-25	HPPG-ESU-TU153A-025	Solid	10/01/20 16:10	10/05/20 08:22	
160-39748-26	HPPG-F-003	Solid	10/01/20 14:42	10/05/20 08:22	
160-39748-27	HPPG-F-004	Solid	10/01/20 16:20	10/05/20 08:22	

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-001

Lab Sample ID: 160-39748-1

Date Collected: 10/01/20 13:05

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0759	U	0.0485	0.0488	0.160	0.0470	pCi/g	10/19/20 12:10	11/09/20 16:52	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	88.8		40 - 110					10/19/20 12:10	11/09/20 16:52	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0511	U	0.162	0.162		0.279	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Actinium 228	0.378		0.146	0.151		0.0657	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Bismuth-212	0.000	U	0.438	0.438		0.554	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Bismuth-214	0.213		0.0869	0.0896		0.0341	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Cesium-137	0.000300	U	0.0706	0.0706	0.0700	0.0581	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Lead-210	0.566	U	0.970	0.972		0.667	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Lead-212	0.166		0.0592	0.0616		0.0341	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Lead-214	0.200		0.0695	0.0724		0.0290	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Potassium-40	7.12		1.38	1.56		0.345	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Protactinium-231	0.427	U	1.70	1.70		1.38	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Protactinium-234	0.0641	U	0.101	0.101		0.182	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Radium-226	0.213		0.0869	0.0896	0.200	0.0341	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Radium-228	0.378		0.146	0.151		0.0657	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thallium-208	0.0292	U	0.0718	0.0719		0.0399	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thorium-232	0.378		0.146	0.151		0.0657	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thorium-234	0.839		0.462	0.471		0.272	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thorium 228	0.166		0.0592	0.0616		0.0341	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Uranium-235	-0.0361	U	0.268	0.268		0.339	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Uranium-238	0.839		0.462	0.471		0.272	pCi/g	10/13/20 17:40	11/08/20 20:06	1

Client Sample ID: HPPG-ESU-TU153A-002

Lab Sample ID: 160-39748-2

Date Collected: 10/01/20 13:25

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.00986	U	0.0577	0.0577	0.160	0.0466	pCi/g	10/19/20 12:10	11/09/20 16:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	93.6		40 - 110					10/19/20 12:10	11/09/20 16:53	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.00304	U	0.506	0.506		0.316	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Actinium 228	0.143		0.193	0.194		0.138	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Bismuth-212	0.347	U	0.797	0.797		0.627	pCi/g	10/13/20 17:40	11/08/20 20:06	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-002
Date Collected: 10/01/20 13:25
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.314		0.114	0.119		0.0515	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Cesium-137	0.0226	U	0.0413	0.0413	0.0700	0.0309	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Lead-210	1.26		1.33	1.34		0.849	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Lead-212	0.310		0.0750	0.0851		0.0340	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Lead-214	0.429		0.130	0.137		0.0567	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Potassium-40	7.58		1.26	1.48		0.288	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Protactinium-231	0.388	U	1.61	1.61		1.98	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Protactinium-234	-0.0105	U	0.0339	0.0339		0.256	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Radium-226	0.314		0.114	0.119	0.200	0.0515	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Radium-228	0.143		0.193	0.194		0.138	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thallium-208	0.142		0.0495	0.0516		0.0186	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thorium-232	0.143		0.193	0.194		0.138	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thorium-234	0.735		0.581	0.587		0.396	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Thorium-228	0.310		0.0750	0.0851		0.0340	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Uranium-235	0.0427	U	0.427	0.427		0.452	pCi/g	10/13/20 17:40	11/08/20 20:06	1
Uranium-238	0.735		0.581	0.587		0.396	pCi/g	10/13/20 17:40	11/08/20 20:06	1

Client Sample ID: HPPG-ESU-TU153A-003

Lab Sample ID: 160-39748-3

Date Collected: 10/01/20 14:07
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.0469		0.0572	0.0573	0.160	0.0429	pCi/g	10/19/20 12:10	11/09/20 16:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	94.9		40 - 110					10/19/20 12:10	11/09/20 16:53	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0587	U	0.389	0.390		0.240	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Actinium 228	0.224		0.101	0.104		0.103	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Bismuth-212	-0.0207	U	0.590	0.590		0.484	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Bismuth-214	0.282		0.0839	0.0889		0.0325	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Cesium-137	0.0266	U	0.0451	0.0452	0.0700	0.0344	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Lead-210	0.953		1.07	1.08		0.693	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Lead-212	0.281		0.0667	0.0760		0.0318	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Lead-214	0.164		0.0701	0.0722		0.0657	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Potassium-40	6.42		1.05	1.24		0.240	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Protactinium-231	-0.636	U	2.16	2.16		1.76	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Protactinium-234	0.0360	U	0.0756	0.0757		0.189	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Radium-226	0.282		0.0839	0.0889	0.200	0.0325	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Radium-228	0.224		0.101	0.104		0.103	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Thallium-208	0.0555		0.0690	0.0692		0.0321	pCi/g	10/13/20 17:40	11/08/20 20:53	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-003
Date Collected: 10/01/20 14:07
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-3
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-232	0.224		0.101	0.104		0.103	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Thorium-234	0.341	U	0.444	0.445		0.357	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Thorium 228	0.281		0.0667	0.0760		0.0318	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Uranium-235	0.000	U	0.167	0.167		0.335	pCi/g	10/13/20 17:40	11/08/20 20:53	1
Uranium-238	0.341	U	0.444	0.445		0.357	pCi/g	10/13/20 17:40	11/08/20 20:53	1

Client Sample ID: HPPG-ESU-TU153A-004
Date Collected: 10/01/20 13:50
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-4
Matrix: Solid

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	-0.0351	U	0.0662	0.0662	0.160	0.0570	pCi/g	10/19/20 12:10	11/09/20 16:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	91.5		40 - 110					10/19/20 12:10	11/09/20 16:53	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.107	U	0.340	0.340		0.197	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Actinium 228	0.395		0.103	0.111		0.0190	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Bismuth-212	0.333	U	0.576	0.578		0.449	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Bismuth-214	0.274		0.0842	0.0889		0.0417	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Cesium-137	-0.0266	U	0.0437	0.0438	0.0700	0.0338	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Lead-210	0.295	U	1.00	1.01		0.813	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Lead-212	0.299		0.0582	0.0698		0.0249	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Lead-214	0.330		0.0804	0.0874		0.0375	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Potassium-40	6.48		0.914	1.13		0.0751	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Protactinium-231	0.000	U	0.179	0.179		1.48	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Protactinium-234	-0.0258	U	0.0534	0.0534		0.174	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Radium-226	0.274		0.0842	0.0889	0.200	0.0417	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Radium-228	0.395		0.103	0.111		0.0190	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Thallium-208	0.0819		0.0540	0.0546		0.0246	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Thorium-232	0.395		0.103	0.111		0.0190	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Thorium-234	-0.285	U	0.949	0.949		0.776	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Thorium 228	0.299		0.0582	0.0698		0.0249	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Uranium-235	0.0293	U	0.161	0.161		0.313	pCi/g	10/13/20 17:41	11/08/20 20:54	1
Uranium-238	-0.285	U	0.949	0.949		0.776	pCi/g	10/13/20 17:41	11/08/20 20:54	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-005
Date Collected: 10/01/20 14:03
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-5
Matrix: Solid

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0565		0.0614	0.0616	0.160	0.0461	pCi/g	10/19/20 12:10	11/09/20 16:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	97.0		40 - 110					10/19/20 12:10	11/09/20 16:53	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0615	U	0.225	0.225		0.318	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Actinium 228	0.414		0.149	0.154		0.0311	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Bismuth-212	0.331	U	0.618	0.619		0.469	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Bismuth-214	0.337		0.122	0.126		0.0559	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Cesium-137	0.0264	U	0.0495	0.0496	0.0700	0.0375	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Lead-210	0.916	U	1.81	1.81		1.44	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Lead-212	0.0359	U	0.104	0.104		0.0834	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Lead-214	0.363		0.113	0.119		0.0610	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Potassium-40	8.23		1.31	1.55		0.121	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Protactinium-231	0.339	U	1.32	1.32		2.05	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Protactinium-234	0.138	U	0.257	0.257		0.221	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Radium-226	0.337		0.122	0.126	0.200	0.0559	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Radium-228	0.414		0.149	0.154		0.0311	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Thallium-208	0.139		0.0429	0.0452		0.00772	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Thorium-232	0.414		0.149	0.154		0.0311	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Thorium-234	-0.217	U	0.969	0.969		0.804	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Thorium 228	0.0359	U	0.104	0.104		0.0834	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Uranium-235	-0.0732	U	0.495	0.495		0.405	pCi/g	10/13/20 17:41	11/08/20 20:55	1
Uranium-238	-0.217	U	0.969	0.969		0.804	pCi/g	10/13/20 17:41	11/08/20 20:55	1

Client Sample ID: HPPG-ESU-TU153A-006

Lab Sample ID: 160-39748-6

Date Collected: 10/01/20 14:31
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0479	U	0.0521	0.0522	0.160	0.0472	pCi/g	10/19/20 12:10	11/09/20 16:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	89.0		40 - 110					10/19/20 12:10	11/09/20 16:53	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.130	U	0.292	0.293		0.240	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Actinium 228	0.257		0.117	0.120		0.0728	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Bismuth-212	0.0186	U	0.517	0.517		0.424	pCi/g	10/13/20 17:41	11/08/20 20:56	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-006
Date Collected: 10/01/20 14:31
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-6
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.208		0.0849	0.0876		0.0380	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Cesium-137	0.00154	U	0.0373	0.0373	0.0700	0.0306	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Lead-210	-0.575	U	1.27	1.27		1.02	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Lead-212	0.290		0.0632	0.0735		0.0310	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Lead-214	0.261		0.0652	0.0706		0.0314	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Potassium-40	7.46		1.05	1.30		0.224	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Protactinium-231	0.000	U	0.426	0.426		1.52	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Protactinium-234	0.0636	U	0.182	0.182		0.148	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Radium-226	0.208		0.0849	0.0876	0.200	0.0380	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Radium-228	0.257		0.117	0.120		0.0728	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Thallium-208	0.121		0.0330	0.0354		0.00629	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Thorium-232	0.257		0.117	0.120		0.0728	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Thorium-234	-0.255	U	0.251	0.253		0.674	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Thorium-228	0.290		0.0632	0.0735		0.0310	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Uranium-235	-0.0622	U	0.174	0.174		0.277	pCi/g	10/13/20 17:41	11/08/20 20:56	1
Uranium-238	-0.255	U	0.251	0.253		0.674	pCi/g	10/13/20 17:41	11/08/20 20:56	1

Client Sample ID: HPPG-ESU-TU153A-007

Lab Sample ID: 160-39748-7

Date Collected: 10/01/20 14:37
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0297	U	0.0598	0.0599	0.160	0.0467	pCi/g	10/19/20 12:10	11/09/20 16:58	1
<i>Carrier</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	89.9		40 - 110					10/19/20 12:10	11/09/20 16:58	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.160	U	0.307	0.307		0.330	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Actinium 228	0.281		0.198	0.200		0.0905	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Bismuth-212	-0.337	U	0.955	0.955		0.754	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Bismuth-214	0.327		0.126	0.131		0.0584	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Cesium-137	-0.0767	U	0.0653	0.0658	0.0700	0.0801	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Lead-210	0.961		1.24	1.24		0.739	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Lead-212	0.270		0.0854	0.0923		0.0466	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Lead-214	0.409		0.112	0.120		0.0526	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Potassium-40	7.72		1.50	1.70		0.270	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Protactinium-231	-0.827	U	2.57	2.57		2.08	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Protactinium-234	0.0139	U	0.0313	0.0313		0.160	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Radium-226	0.327		0.126	0.131	0.200	0.0584	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Radium-228	0.281		0.198	0.200		0.0905	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thallium-208	0.0940		0.0634	0.0642		0.0430	pCi/g	10/13/20 17:41	11/08/20 20:57	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-007
Date Collected: 10/01/20 14:37
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-7
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-232	0.281		0.198	0.200		0.0905	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thorium-234	0.684		0.490	0.496		0.303	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thorium 228	0.270		0.0854	0.0923		0.0466	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Uranium-235	-0.0111	U	0.264	0.264		0.235	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Uranium-238	0.684		0.490	0.496		0.303	pCi/g	10/13/20 17:41	11/08/20 20:57	1

Client Sample ID: HPPG-ESU-TU153A-008

Lab Sample ID: 160-39748-8

Date Collected: 10/01/20 14:42

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0230	U	0.0492	0.0493	0.160	0.0428	pCi/g	10/19/20 12:10	11/09/20 16:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	89.2		40 - 110					10/19/20 12:10	11/09/20 16:58	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.105	U	0.288	0.289		0.252	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Actinium 228	0.354		0.149	0.154		0.0526	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Bismuth-212	0.234	U	0.502	0.503		0.388	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Bismuth-214	0.282		0.0857	0.0905		0.0310	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Cesium-137	-0.0167	U	0.0571	0.0571	0.0700	0.0317	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Lead-210	0.609	U	0.985	0.988		0.699	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Lead-212	0.000800	U	0.0943	0.0943		0.0775	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Lead-214	0.301		0.0830	0.0887		0.0448	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Potassium-40	6.74		1.06	1.26		0.235	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Protactinium-231	0.000	U	0.356	0.356		1.71	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Protactinium-234	-0.0760	U	0.186	0.186		0.150	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Radium-226	0.282		0.0857	0.0905	0.200	0.0310	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Radium-228	0.354		0.149	0.154		0.0526	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thallium-208	0.0785		0.0520	0.0526		0.0276	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thorium-232	0.354		0.149	0.154		0.0526	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thorium-234	-0.591	U	0.711	0.714		0.596	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Thorium 228	0.000800	U	0.0943	0.0943		0.0775	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Uranium-235	0.110	U	0.222	0.222		0.201	pCi/g	10/13/20 17:41	11/08/20 20:57	1
Uranium-238	-0.591	U	0.711	0.714		0.596	pCi/g	10/13/20 17:41	11/08/20 20:57	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-009
Date Collected: 10/01/20 15:07
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-9
Matrix: Solid

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0251	U	0.0626	0.0627	0.160	0.0495	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	90.7		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.102	U	0.425	0.425		0.271	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Actinium 228	0.155		0.145	0.145		0.0916	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Bismuth-212	0.384	U	0.844	0.845		0.669	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Bismuth-214	0.0165	U	0.152	0.152		0.126	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Cesium-137	0.0137	U	0.0320	0.0320	0.0700	0.0243	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Lead-210	0.692		0.935	0.939		0.652	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Lead-212	0.181		0.0650	0.0691		0.0390	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Lead-214	0.234		0.0812	0.0847		0.0447	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Potassium-40	7.57		1.16	1.39		0.247	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Protactinium-231	0.517	U	1.57	1.57		1.72	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Protactinium-234	0.0228	U	0.0509	0.0510		0.210	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Radium-226	0.0165	U	0.152	0.152	0.200	0.126	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Radium-228	0.155		0.145	0.145		0.0916	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thallium-208	0.0681		0.0456	0.0461		0.0216	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thorium-232	0.155		0.145	0.145		0.0916	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thorium-234	0.0970	U	0.420	0.420		0.338	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thorium 228	0.181		0.0650	0.0691		0.0390	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Uranium-235	0.0703	U	0.188	0.188		0.393	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Uranium-238	0.0970	U	0.420	0.420		0.338	pCi/g	10/13/20 17:41	11/08/20 21:31	1

Client Sample ID: HPPG-ESU-TU153A-010

Lab Sample ID: 160-39748-10

Date Collected: 10/01/20 15:13
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0414		0.0522	0.0523	0.160	0.0389	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	92.0		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0710	U	0.157	0.157		0.216	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Actinium 228	0.126		0.172	0.173		0.0950	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Bismuth-212	-0.0547	U	0.542	0.542		0.442	pCi/g	10/13/20 17:41	11/08/20 21:31	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-010
Date Collected: 10/01/20 15:13
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-10
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.280		0.0842	0.0891		0.0352	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Cesium-137	-0.0116	U	0.0449	0.0449	0.0700	0.0360	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Lead-210	0.389	U	0.851	0.852		0.678	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Lead-212	0.0284	U	0.0730	0.0731		0.0588	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Lead-214	0.244		0.0710	0.0754		0.0386	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Potassium-40	6.89		0.942	1.18		0.0750	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Protactinium-231	-0.399	U	1.91	1.91		1.56	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Protactinium-234	0.0100	U	0.0403	0.0403		0.159	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Radium-226	0.280		0.0842	0.0891	0.200	0.0352	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Radium-228	0.126		0.172	0.173		0.0950	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thallium-208	0.0807		0.0544	0.0550		0.0246	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thorium-232	0.126		0.172	0.173		0.0950	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thorium-234	-0.208	U	0.771	0.771		0.630	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Thorium-228	0.0284	U	0.0730	0.0731		0.0588	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Uranium-235	-0.0180	U	0.0285	0.0285		0.270	pCi/g	10/13/20 17:41	11/08/20 21:31	1
Uranium-238	-0.208	U	0.771	0.771		0.630	pCi/g	10/13/20 17:41	11/08/20 21:31	1

Client Sample ID: HPPG-ESU-TU153A-011

Lab Sample ID: 160-39748-11

Date Collected: 10/01/20 15:20
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0150	U	0.0573	0.0573	0.160	0.0457	pCi/g	10/19/20 12:10	11/09/20 16:59	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Sr Carrier	83.5		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0592	U	0.429	0.429		0.264	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Actinium 228	0.288		0.156	0.158		0.0902	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Bismuth-212	0.0266	U	0.708	0.708		0.581	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Bismuth-214	-0.131	U	0.103	0.104		0.210	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Cesium-137	0.00220	U	0.0534	0.0534	0.0700	0.0438	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Lead-210	0.331	U	1.14	1.14		0.811	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Lead-212	0.263		0.0711	0.0762		0.0355	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Lead-214	0.265		0.102	0.105		0.0474	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Potassium-40	7.40		1.19	1.40		0.111	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Protactinium-231	0.000	U	0.736	0.736		1.99	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Protactinium-234	-0.0943	U	0.286	0.286		0.232	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Radium-226	-0.131	U	0.103	0.104	0.200	0.210	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Radium-228	0.288		0.156	0.158		0.0902	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Thallium-208	0.145		0.0506	0.0527		0.0144	pCi/g	10/13/20 17:41	11/08/20 21:32	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-011

Lab Sample ID: 160-39748-11

Date Collected: 10/01/20 15:20

Matrix: Solid

Date Received: 10/05/20 08:22

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-232	0.288		0.156	0.158		0.0902	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Thorium-234	-0.488	U	0.893	0.895		0.750	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Thorium 228	0.263		0.0711	0.0762		0.0355	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Uranium-235	-0.00456	U	0.480	0.480		0.395	pCi/g	10/13/20 17:41	11/08/20 21:32	1
Uranium-238	-0.488	U	0.893	0.895		0.750	pCi/g	10/13/20 17:41	11/08/20 21:32	1

Client Sample ID: HPPG-ESU-TU153A-012

Lab Sample ID: 160-39748-12

Date Collected: 10/01/20 15:45

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.00997	U	0.0531	0.0531	0.160	0.0428	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	91.7		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.216	U	0.452	0.452		0.260	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Actinium 228	0.186		0.102	0.104		0.117	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Bismuth-212	-0.351	U	0.608	0.610		0.474	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Bismuth-214	0.246		0.0835	0.0873		0.0357	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Cesium-137	0.0163	U	0.0387	0.0387	0.0700	0.0302	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Lead-210	-0.602	U	1.33	1.33		1.07	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Lead-212	0.273		0.0633	0.0725		0.0325	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Lead-214	0.234		0.0649	0.0693		0.0356	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Potassium-40	6.98		1.02	1.25		0.226	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Protactinium-231	0.0538	U	0.729	0.729		1.51	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Protactinium-234	-0.0732	U	0.209	0.209		0.170	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Radium-226	0.246		0.0835	0.0873	0.200	0.0357	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Radium-228	0.186		0.102	0.104		0.117	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thallium-208	0.0731		0.0427	0.0434		0.0197	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thorium-232	0.186		0.102	0.104		0.117	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thorium-234	-0.285	U	0.373	0.375		0.721	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thorium 228	0.273		0.0633	0.0725		0.0325	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Uranium-235	0.0759	U	0.134	0.134		0.308	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Uranium-238	-0.285	U	0.373	0.375		0.721	pCi/g	10/13/20 17:41	11/08/20 21:33	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-013
Date Collected: 10/01/20 15:50
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-13
Matrix: Solid

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0266	U	0.0592	0.0593	0.160	0.0465	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	91.3		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.00991	U	0.0621	0.0621		0.324	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Actinium 228	0.126	U	0.239	0.239		0.142	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Bismuth-212	0.000	U	0.144	0.144		0.310	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Bismuth-214	0.237		0.110	0.112		0.0581	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Cesium-137	-0.0490	U	0.0698	0.0700	0.0700	0.0588	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Lead-210	-0.109	U	1.17	1.17		0.838	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Lead-212	0.201		0.0719	0.0764		0.0397	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Lead-214	0.313		0.110	0.115		0.0771	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Potassium-40	6.28		1.31	1.46		0.252	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Protactinium-231	-0.734	U	2.32	2.32		1.88	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Protactinium-234	-0.0741	U	0.244	0.244		0.153	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Radium-226	0.237		0.110	0.112	0.200	0.0581	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Radium-228	0.126	U	0.239	0.239		0.142	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thallium-208	0.0987		0.0483	0.0494		0.0173	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thorium-232	0.126	U	0.239	0.239		0.142	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thorium-234	0.341	U	0.247	0.250		0.647	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Thorium 228	0.201		0.0719	0.0764		0.0397	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Uranium-235	-0.0962	U	0.420	0.420		0.257	pCi/g	10/13/20 17:41	11/08/20 21:33	1
Uranium-238	0.341	U	0.247	0.250		0.647	pCi/g	10/13/20 17:41	11/08/20 21:33	1

Client Sample ID: HPPG-ESU-TU153A-014

Lab Sample ID: 160-39748-14

Date Collected: 10/01/20 16:00
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0220	U	0.0594	0.0594	0.160	0.0471	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	93.4		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.365		0.376	0.379		0.212	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Actinium 228	0.300		0.191	0.194		0.0996	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Bismuth-212	0.257	U	0.512	0.513		0.392	pCi/g	10/13/20 17:41	11/08/20 21:35	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-014
Date Collected: 10/01/20 16:00
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-14
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.239		0.114	0.117		0.0558	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Cesium-137	0.0217	U	0.0511	0.0512	0.0700	0.0400	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Lead-210	0.552	U	1.00	1.01		0.730	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Lead-212	0.257		0.0683	0.0760		0.0345	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Lead-214	0.347		0.0947	0.101		0.0432	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Potassium-40	7.37		1.16	1.39		0.258	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Protactinium-231	-0.194	U	2.42	2.42		1.99	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Protactinium-234	0.0103	U	0.0168	0.0169		0.160	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Radium-226	0.239		0.114	0.117	0.200	0.0558	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Radium-228	0.300		0.191	0.194		0.0996	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Thallium-208	0.0916		0.0555	0.0563		0.0267	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Thorium-232	0.300		0.191	0.194		0.0996	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Thorium-234	-0.404	U	0.755	0.756		0.634	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Thorium-228	0.257		0.0683	0.0760		0.0345	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Uranium-235	0.0810	U	0.208	0.208		0.208	pCi/g	10/13/20 17:41	11/08/20 21:35	1
Uranium-238	-0.404	U	0.755	0.756		0.634	pCi/g	10/13/20 17:41	11/08/20 21:35	1

Client Sample ID: HPPG-ESU-TU153A-015

Lab Sample ID: 160-39748-15

Date Collected: 10/01/20 16:02
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0857		0.0734	0.0736	0.160	0.0545	pCi/g	10/19/20 12:10	11/09/20 16:59	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Sr Carrier	92.7		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0885	U	0.401	0.401		0.245	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Actinium 228	0.330		0.135	0.139		0.0320	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Bismuth-212	0.000	U	0.408	0.408		0.583	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Bismuth-214	0.290		0.0990	0.103		0.0373	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Cesium-137	-0.00238	U	0.0394	0.0394	0.0700	0.0466	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Lead-210	1.12		1.23	1.24		0.796	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Lead-212	0.161		0.0604	0.0627		0.0352	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Lead-214	0.303		0.0908	0.0958		0.0342	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Potassium-40	6.60		1.25	1.41		0.199	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Protactinium-231	0.482	U	1.55	1.55		1.70	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Protactinium-234	0.00176	U	0.00385	0.00386		0.171	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Radium-226	0.290		0.0990	0.103	0.200	0.0373	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Radium-228	0.330		0.135	0.139		0.0320	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Thallium-208	0.110		0.0404	0.0419		0.00788	pCi/g	10/13/20 17:41	11/08/20 21:38	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-015

Lab Sample ID: 160-39748-15

Date Collected: 10/01/20 16:02

Matrix: Solid

Date Received: 10/05/20 08:22

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-232	0.330		0.135	0.139		0.0320	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Thorium-234	0.579		0.428	0.433		0.299	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Thorium 228	0.161		0.0604	0.0627		0.0352	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Uranium-235	-0.0379	U	0.254	0.254		0.303	pCi/g	10/13/20 17:41	11/08/20 21:38	1
Uranium-238	0.579		0.428	0.433		0.299	pCi/g	10/13/20 17:41	11/08/20 21:38	1

Client Sample ID: HPPG-ESU-TU153A-016

Lab Sample ID: 160-39748-16

Date Collected: 10/01/20 16:04

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.0368	U	0.0644	0.0644	0.160	0.0501	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	89.9		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.196	U	0.389	0.390		0.243	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Actinium 228	0.343		0.153	0.157		0.0734	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Bismuth-212	-0.331	U	0.604	0.605		0.466	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Bismuth-214	0.181		0.0919	0.0938		0.0443	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Cesium-137	0.000	U	0.0135	0.0135	0.0700	0.0111	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Lead-210	-0.619	U	1.22	1.23		1.03	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Lead-212	0.243		0.0630	0.0704		0.0306	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Lead-214	0.252		0.0828	0.0869		0.0380	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Potassium-40	5.93		1.02	1.19		0.242	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Protactinium-231	0.525	U	1.54	1.54		1.68	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Protactinium-234	0.0355	U	0.196	0.196		0.188	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Radium-226	0.181		0.0919	0.0938	0.200	0.0443	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Radium-228	0.343		0.153	0.157		0.0734	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Thallium-208	0.0524		0.0334	0.0338		0.0160	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Thorium-232	0.343		0.153	0.157		0.0734	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Thorium-234	0.204	U	0.438	0.439		0.348	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Thorium 228	0.243		0.0630	0.0704		0.0306	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Uranium-235	-0.146	U	0.466	0.466		0.380	pCi/g	10/13/20 17:41	11/08/20 22:05	1
Uranium-238	0.204	U	0.438	0.439		0.348	pCi/g	10/13/20 17:41	11/08/20 22:05	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-017

Lab Sample ID: 160-39748-17

Matrix: Solid

Date Collected: 10/01/20 15:48
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0324	U	0.0550	0.0550	0.160	0.0481	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	87.3		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.181	U	0.448	0.448		0.260	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Actinium 228	0.332		0.111	0.116		0.0766	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Bismuth-212	0.149	U	0.420	0.420		0.330	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Bismuth-214	0.292		0.0805	0.0861		0.0311	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Cesium-137	0.0124	U	0.0219	0.0220	0.0700	0.0158	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Lead-210	0.477	U	1.04	1.04		0.831	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Lead-212	0.283		0.0585	0.0690		0.0259	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Lead-214	0.264		0.0752	0.0801		0.0420	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Potassium-40	6.74		0.951	1.17		0.0781	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Protactinium-231	0.240	U	0.903	0.903		1.41	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Protactinium-234	0.0870	U	0.148	0.148		0.147	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Radium-226	0.292		0.0805	0.0861	0.200	0.0311	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Radium-228	0.332		0.111	0.116		0.0766	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thallium-208	0.0290		0.0551	0.0552		0.0277	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thorium-232	0.332		0.111	0.116		0.0766	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thorium-234	-0.00676	U	0.0140	0.0140		0.790	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thorium 228	0.283		0.0585	0.0690		0.0259	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Uranium-235	-0.139	U	0.392	0.392		0.319	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Uranium-238	-0.00676	U	0.0140	0.0140		0.790	pCi/g	10/13/20 17:41	11/08/20 22:06	1

Client Sample ID: HPPG-ESU-TU153A-018

Lab Sample ID: 160-39748-18

Matrix: Solid

Date Collected: 10/01/20 15:35
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0896		0.0664	0.0667	0.160	0.0473	pCi/g	10/19/20 12:10	11/09/20 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	87.0		40 - 110					10/19/20 12:10	11/09/20 16:59	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.0643	U	0.464	0.464		0.285	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Actinium 228	0.320		0.128	0.132		0.108	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Bismuth-212	0.224	U	0.565	0.565		0.439	pCi/g	10/13/20 17:41	11/08/20 22:06	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-018
Date Collected: 10/01/20 15:35
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-18
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.295		0.104	0.108		0.0472	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Cesium-137	0.0237	U	0.0422	0.0423	0.0700	0.0316	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Lead-210	0.408	U	1.43	1.44		1.15	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Lead-212	0.275		0.0724	0.0779		0.0366	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Lead-214	0.361		0.104	0.111		0.0443	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Potassium-40	8.72		1.27	1.55		0.108	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Protactinium-231	0.0000000	U	2.28	2.28		1.88	pCi/g	10/13/20 17:41	11/08/20 22:06	1
	126									9
Protactinium-234	0.112	U	0.198	0.199		0.187	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Radium-226	0.295		0.104	0.108	0.200	0.0472	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Radium-228	0.320		0.128	0.132		0.108	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thallium-208	0.138		0.0542	0.0560		0.0192	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thorium-232	0.320		0.128	0.132		0.108	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thorium-234	-0.222	U	0.840	0.841		0.698	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Thorium 228	0.275		0.0724	0.0779		0.0366	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Uranium-235	0.0268	U	0.245	0.246		0.201	pCi/g	10/13/20 17:41	11/08/20 22:06	1
Uranium-238	-0.222	U	0.840	0.841		0.698	pCi/g	10/13/20 17:41	11/08/20 22:06	1

Client Sample ID: HPPG-ESU-TU153A-019

Lab Sample ID: 160-39748-19

Date Collected: 10/01/20 16:10
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	-0.0246	U	0.0506	0.0507	0.160	0.0439	pCi/g	10/19/20 12:10	11/09/20 17:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	92.1		40 - 110					10/19/20 12:10	11/09/20 17:00	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.258		0.254	0.256		0.153	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Actinium 228	0.344		0.147	0.151		0.0563	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Bismuth-212	0.227	U	0.460	0.461		0.355	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Bismuth-214	0.186		0.0772	0.0796		0.0360	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Cesium-137	-0.0186	U	0.0471	0.0471	0.0700	0.0372	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Lead-210	-0.580	U	1.28	1.28		1.03	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Lead-212	0.197		0.0730	0.0773		0.0350	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Lead-214	0.0156	U	0.0144	0.0145		0.0946	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Potassium-40	5.96		1.13	1.28		0.366	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Protactinium-231	0.370	U	1.07	1.07		1.17	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Protactinium-234	0.106	U	0.194	0.195		0.144	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Radium-226	0.186		0.0772	0.0796	0.200	0.0360	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Radium-228	0.344		0.147	0.151		0.0563	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Thallium-208	0.0945		0.0420	0.0432		0.0168	pCi/g	10/13/20 17:41	11/08/20 22:07	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-019

Lab Sample ID: 160-39748-19

Date Collected: 10/01/20 16:10

Matrix: Solid

Date Received: 10/05/20 08:22

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-232	0.344		0.147	0.151		0.0563	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Thorium-234	-0.271	U	0.361	0.362		0.732	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Thorium 228	0.197		0.0730	0.0773		0.0350	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Uranium-235	0.000	U	0.109	0.109		0.275	pCi/g	10/13/20 17:41	11/08/20 22:07	1
Uranium-238	-0.271	U	0.361	0.362		0.732	pCi/g	10/13/20 17:41	11/08/20 22:07	1

Client Sample ID: HPPG-ESU-TU153A-020

Lab Sample ID: 160-39748-20

Date Collected: 10/01/20 16:01

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	-0.00862	U	0.0574	0.0574	0.160	0.0480	pCi/g	10/19/20 12:10	11/09/20 17:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	86.9		40 - 110					10/19/20 12:10	11/09/20 17:00	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.00805	U	0.548	0.548		0.341	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Actinium 228	0.317		0.140	0.143		0.0885	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Bismuth-212	0.000	U	0.399	0.399		0.305	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Bismuth-214	0.201		0.119	0.121		0.0575	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Cesium-137	0.00679	U	0.0698	0.0698	0.0700	0.0565	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Lead-210	1.49		1.20	1.22		0.683	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Lead-212	0.225		0.0887	0.0933		0.0453	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Lead-214	0.266		0.101	0.105		0.0484	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Potassium-40	5.40		1.61	1.70		0.580	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Protactinium-231	0.000	U	0.687	0.687		1.95	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Protactinium-234	-0.0181	U	0.124	0.124		0.143	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Radium-226	0.201		0.119	0.121	0.200	0.0575	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Radium-228	0.317		0.140	0.143		0.0885	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Thallium-208	0.0606		0.0546	0.0550		0.0272	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Thorium-232	0.317		0.140	0.143		0.0885	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Thorium-234	0.313		0.359	0.361		0.295	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Thorium 228	0.225		0.0887	0.0933		0.0453	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Uranium-235	-0.0108	U	0.217	0.217		0.246	pCi/g	10/13/20 17:41	11/08/20 22:08	1
Uranium-238	0.313		0.359	0.361		0.295	pCi/g	10/13/20 17:41	11/08/20 22:08	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-021

Lab Sample ID: 160-39748-21

Date Collected: 10/01/20 15:55

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.00943	U	0.0557	0.0557	0.160	0.0467	pCi/g	10/19/20 12:10	11/09/20 17:03	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	92.5		40 - 110					10/19/20 12:10	11/09/20 17:03	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.119	U	0.342	0.342		0.349	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Actinium 228	0.230		0.193	0.195		0.117	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Bismuth-212	-0.408	U	0.882	0.884		0.692	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Bismuth-214	0.319		0.146	0.150		0.0651	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Cesium-137	0.0397	U	0.0741	0.0743	0.0700	0.0576	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Lead-210	1.96		1.68	1.70		0.970	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Lead-212	0.373		0.115	0.123		0.0748	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Lead-214	0.346		0.0979	0.106		0.0436	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Potassium-40	8.43		1.39	1.69		0.265	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Protactinium-231	0.289	U	1.45	1.45		2.26	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Protactinium-234	-0.0191	U	0.0438	0.0439		0.257	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Radium-226	0.319		0.146	0.150	0.200	0.0651	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Radium-228	0.230		0.193	0.195		0.117	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Thallium-208	0.0354	U	0.0873	0.0874		0.0398	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Thorium-232	0.230		0.193	0.195		0.117	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Thorium-234	-0.482	U	0.728	0.731		0.617	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Thorium 228	0.373		0.115	0.123		0.0748	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Uranium-235	0.122	U	0.325	0.325		0.272	pCi/g	10/14/20 13:40	11/11/20 16:34	1
Uranium-238	-0.482	U	0.728	0.731		0.617	pCi/g	10/14/20 13:40	11/11/20 16:34	1

Client Sample ID: HPPG-ESU-TU153A-022

Lab Sample ID: 160-39748-22

Date Collected: 10/01/20 16:20

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0457		0.0560	0.0561	0.160	0.0422	pCi/g	10/20/20 07:09	11/09/20 16:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	101		40 - 110					10/20/20 07:09	11/09/20 16:48	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0902	U	0.200	0.201		0.304	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Actinium 228	0.0857	U	0.162	0.162		0.133	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Bismuth-212	0.342	U	0.806	0.807		0.630	pCi/g	10/14/20 13:40	11/11/20 17:47	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-022
Date Collected: 10/01/20 16:20
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-22
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.260		0.0996	0.103		0.0427	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Cesium-137	0.0529		0.0476	0.0479	0.0700	0.0308	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Lead-210	0.405	U	0.713	0.714		0.513	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Lead-212	0.154		0.0605	0.0637		0.0330	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Lead-214	0.199		0.0845	0.0870		0.0420	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Potassium-40	7.41		1.37	1.57		0.236	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Protactinium-231	0.000	U	0.637	0.637		1.51	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Protactinium-234	0.0543	U	0.143	0.143		0.114	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Radium-226	0.260		0.0996	0.103	0.200	0.0427	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Radium-228	0.0857	U	0.162	0.162		0.133	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Thallium-208	0.104		0.0393	0.0408		0.00825	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Thorium-232	0.0857	U	0.162	0.162		0.133	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Thorium-234	0.172	U	0.384	0.385		0.294	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Thorium 228	0.154		0.0605	0.0637		0.0330	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Uranium-235	-0.00967	U	0.258	0.258		0.205	pCi/g	10/14/20 13:40	11/11/20 17:47	1
Uranium-238	0.172	U	0.384	0.385		0.294	pCi/g	10/14/20 13:40	11/11/20 17:47	1

Client Sample ID: HPPG-ESU-TU153A-023

Lab Sample ID: 160-39748-23

Date Collected: 10/01/20 16:15
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.0505		0.0636	0.0637	0.160	0.0484	pCi/g	10/20/20 07:09	11/09/20 16:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	93.2		40 - 110					10/20/20 07:09	11/09/20 16:48	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0554	U	0.347	0.347		0.204	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Actinium 228	0.299		0.116	0.120		0.0553	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Bismuth-212	0.185	U	0.395	0.395		0.304	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Bismuth-214	0.195		0.0655	0.0686		0.0284	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Cesium-137	0.0120	U	0.0210	0.0210	0.0700	0.0150	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Lead-210	0.703		0.773	0.777		0.444	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Lead-212	0.172		0.0510	0.0556		0.0273	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Lead-214	0.254		0.0654	0.0705		0.0265	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Potassium-40	5.67		0.908	1.08		0.217	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Protactinium-231	0.230	U	0.887	0.887		1.39	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Protactinium-234	-0.0646	U	0.185	0.185		0.150	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Radium-226	0.195		0.0655	0.0686	0.200	0.0284	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Radium-228	0.299		0.116	0.120		0.0553	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Thallium-208	0.0910		0.0284	0.0299		0.00609	pCi/g	10/14/20 13:40	11/11/20 17:48	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-023
Date Collected: 10/01/20 16:15
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-23
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-232	0.299		0.116	0.120		0.0553	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Thorium-234	0.0480	U	0.299	0.299		0.592	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Thorium 228	0.172		0.0510	0.0556		0.0273	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Uranium-235	0.000	U	0.0951	0.0951		0.303	pCi/g	10/14/20 13:40	11/11/20 17:48	1
Uranium-238	0.0480	U	0.299	0.299		0.592	pCi/g	10/14/20 13:40	11/11/20 17:48	1

Client Sample ID: HPPG-ESU-TU153A-024
Date Collected: 10/01/20 16:23
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-24
Matrix: Solid

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	-0.00756	U	0.0609	0.0609	0.160	0.0507	pCi/g	10/20/20 07:09	11/09/20 16:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	92.1		40 - 110					10/20/20 07:09	11/09/20 16:48	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0656	U	0.431	0.431		0.265	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Actinium 228	0.292		0.107	0.111		0.0818	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Bismuth-212	0.235	U	0.710	0.711		0.565	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Bismuth-214	0.256		0.119	0.122		0.0582	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Cesium-137	-0.0380	U	0.0631	0.0632	0.0700	0.0489	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Lead-210	0.520	U	1.28	1.28		0.834	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Lead-212	0.229		0.0666	0.0708		0.0361	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Lead-214	0.364		0.0985	0.105		0.0435	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Potassium-40	7.23		1.12	1.33		0.100	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Protactinium-231	-0.259	U	2.08	2.08		1.70	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Protactinium-234	-0.0872	U	0.264	0.264		0.215	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Radium-226	0.256		0.119	0.122	0.200	0.0582	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Radium-228	0.292		0.107	0.111		0.0818	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thallium-208	0.110		0.0445	0.0459		0.0161	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thorium-232	0.292		0.107	0.111		0.0818	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thorium-234	0.797		0.491	0.499		0.358	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thorium 228	0.229		0.0666	0.0708		0.0361	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Uranium-235	0.177	U	0.331	0.332		0.351	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Uranium-238	0.797		0.491	0.499		0.358	pCi/g	10/14/20 13:40	11/11/20 17:50	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-025

Lab Sample ID: 160-39748-25

Date Collected: 10/01/20 16:10

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0213	U	0.0560	0.0561	0.160	0.0478	pCi/g	10/20/20 07:09	11/09/20 16:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	92.8		40 - 110					10/20/20 07:09	11/09/20 16:48	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0349	U	0.111	0.111		0.264	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Actinium 228	0.177		0.0993	0.101		0.0436	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Bismuth-212	0.0361	U	0.474	0.474		0.387	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Bismuth-214	0.105		0.0564	0.0574		0.0796	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Cesium-137	-0.0164	U	0.0482	0.0483	0.0700	0.0385	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Lead-210	0.188	U	1.06	1.06		0.864	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Lead-212	0.232		0.0549	0.0626		0.0268	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Lead-214	0.265		0.0726	0.0776		0.0298	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Potassium-40	6.81		0.949	1.18		0.0771	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Protactinium-231	-0.612	U	1.86	1.86		1.51	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Protactinium-234	0.110		0.101	0.102		0.0580	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Radium-226	0.105		0.0564	0.0574	0.200	0.0796	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Radium-228	0.177		0.0993	0.101		0.0436	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Thallium-208	0.0925		0.0307	0.0321		0.00804	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Thorium-232	0.177		0.0993	0.101		0.0436	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Thorium-234	0.218	U	0.443	0.443		0.508	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Thorium 228	0.232		0.0549	0.0626		0.0268	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Uranium-235	0.00207	U	0.209	0.209		0.172	pCi/g	10/14/20 13:40	11/11/20 17:51	1
Uranium-238	0.218	U	0.443	0.443		0.508	pCi/g	10/14/20 13:40	11/11/20 17:51	1

Client Sample ID: HPPG-F-003

Lab Sample ID: 160-39748-26

Date Collected: 10/01/20 14:42

Matrix: Solid

Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0649		0.0592	0.0594	0.160	0.0433	pCi/g	10/20/20 07:09	11/09/20 16:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	94.9		40 - 110					10/20/20 07:09	11/09/20 16:49	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.241		0.358	0.359		0.229	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Actinium 228	0.121		0.194	0.195		0.102	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Bismuth-212	-0.540	U	0.874	0.876		0.675	pCi/g	10/14/20 13:40	11/11/20 17:49	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-F-003

Date Collected: 10/01/20 14:42
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-26

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.210		0.0974	0.0998		0.0452	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Cesium-137	-0.0216	U	0.0597	0.0597	0.0700	0.0470	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Lead-210	-0.460	U	1.43	1.43		1.19	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Lead-212	0.217		0.0832	0.0878		0.0532	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Lead-214	0.203		0.0791	0.0818		0.0304	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Potassium-40	6.32		1.18	1.35		0.129	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Protactinium-231	0.000	U	0.221	0.221		1.74	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Protactinium-234	0.0761	U	0.230	0.230		0.186	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Radium-226	0.210		0.0974	0.0998	0.200	0.0452	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Radium-228	0.121		0.194	0.195		0.102	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Thallium-208	0.0705		0.0460	0.0466		0.0221	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Thorium-232	0.121		0.194	0.195		0.102	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Thorium-234	-0.441	U	0.735	0.737		0.854	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Thorium-228	0.217		0.0832	0.0878		0.0532	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Uranium-235	0.0832	U	0.175	0.176		0.329	pCi/g	10/14/20 13:40	11/11/20 17:49	1
Uranium-238	-0.441	U	0.735	0.737		0.854	pCi/g	10/14/20 13:40	11/11/20 17:49	1

Client Sample ID: HPPG-F-004

Date Collected: 10/01/20 16:20
Date Received: 10/05/20 08:22

Lab Sample ID: 160-39748-27

Matrix: Solid

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0447	U	0.0673	0.0674	0.160	0.0519	pCi/g	10/20/20 07:09	11/09/20 16:49	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Sr Carrier	87.9		40 - 110					10/20/20 07:09	11/09/20 16:49	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0550	U	0.243	0.243		0.274	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Actinium 228	0.370		0.152	0.157		0.0351	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Bismuth-212	0.343	U	0.764	0.764		0.593	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Bismuth-214	0.241		0.0973	0.100		0.0429	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Cesium-137	-0.0449	U	0.0681	0.0683	0.0700	0.0552	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Lead-210	0.640		0.878	0.881		0.587	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Lead-212	0.202		0.0658	0.0708		0.0333	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Lead-214	0.242		0.0856	0.0892		0.0457	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Potassium-40	7.69		1.40	1.61		0.237	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Protactinium-231	0.407	U	1.34	1.34		1.47	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Protactinium-234	-0.00905	U	0.0169	0.0169		0.152	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Radium-226	0.241		0.0973	0.100	0.200	0.0429	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Radium-228	0.370		0.152	0.157		0.0351	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Thallium-208	0.0837		0.0694	0.0699		0.0296	pCi/g	10/14/20 13:40	11/11/20 18:37	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Client Sample ID: HPPG-F-004

Lab Sample ID: 160-39748-27

Date Collected: 10/01/20 16:20

Matrix: Solid

Date Received: 10/05/20 08:22

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-232	0.370		0.152	0.157		0.0351	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Thorium-234	-0.569	U	0.636	0.639		0.622	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Thorium 228	0.202		0.0658	0.0708		0.0333	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Uranium-235	-0.117	U	0.246	0.246		0.222	pCi/g	10/14/20 13:40	11/11/20 18:37	1
Uranium-238	-0.569	U	0.636	0.639		0.622	pCi/g	10/14/20 13:40	11/11/20 18:37	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-486072/24-A

Matrix: Solid

Analysis Batch: 488581

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 486072

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit pCi/g	Prepared 10/19/20 12:10	Analyzed 11/09/20 17:03	Dil Fac 1
	Result	Qualifier								
Total Beta Strontium	0.01945	U	0.0538	0.0539	0.160	0.0426	pCi/g			
Carrier										
Sr Carrier	95.3			40 - 110				Prepared 10/19/20 12:10	Analyzed 11/09/20 17:03	Dil Fac 1

Lab Sample ID: LCS 160-486072/1-A

Matrix: Solid

Analysis Batch: 488625

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 486072

Analyte	Spike		LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit pCi/g	%Rec	%Rec. Limits	
	Added	Result									
Total Beta Strontium		7.78	6.813		0.554	0.160	0.0491	pCi/g	88	75 - 125	
Carrier											
Sr Carrier	99.3			40 - 110							

Lab Sample ID: 160-39748-1 DU

Matrix: Solid

Analysis Batch: 488625

Client Sample ID: HPPG-ESU-TU153A-001

Prep Type: Total/NA

Prep Batch: 486072

Analyte	Sample		DU DU		Total Uncert. (2σ+/-)	LOQ	DLC	Unit pCi/g	RER	RER Limit
	Result	Qual	Result	Qual						
Total Beta Strontium	-0.0759	U		-0.05251	U	0.0467	0.160	0.0430	pCi/g	0.24
Carrier										
Sr Carrier	106			40 - 110						

Lab Sample ID: LCS 160-486247/1-A

Matrix: Solid

Analysis Batch: 488624

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 486247

Analyte	Spike		LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit pCi/g	%Rec	%Rec. Limits	
	Added	Result									
Total Beta Strontium		7.78	6.438		0.528	0.160	0.0457	pCi/g	83	75 - 125	
Carrier											
Sr Carrier	96.5			40 - 110							

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QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Method: 905.0 - Total Beta Strontium (GFPC) (Continued)

Lab Sample ID: 160-39748-22 DU

Client Sample ID: HPPG-ESU-TU153A-022

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488624

Prep Batch: 486247

Analyte	Sample	Sample	DU		DU		Total		LOQ	DLC	Unit	RER	RER	Limit
	Result	Qual			(2σ+/-)	Uncert.								
Total Beta Strontium	0.0457		-0.00334	U	2	0.0576	0.160	0.0477	pCi/g	0.43	1			
Carrier														
Sr Carrier	97.1		Limits											

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-485412/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488179

Prep Batch: 485412

Analyte	MB	MB	Count		Total		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	(2σ+/-)	Uncert.	(2σ+/-)						
Actinium-227	0.03494	U	0.0810	0.0811	0.255	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Actinium 228	0.06643	U	0.143	0.143	0.0924	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Bismuth-212	0.3174	U	0.775	0.776	0.611	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Bismuth-214	-0.03116	U	0.110	0.110	0.0922	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Cesium-137	-0.02545	U	0.0539	0.0540	0.0417	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Lead-210	0.1782	U	0.963	0.963	0.777	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Lead-212	0.01742	U	0.0743	0.0743	0.0597	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Lead-214	-0.004189	U	0.0140	0.0140	0.0700	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Potassium-40	-0.04060	U	0.712	0.712	0.436	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Protactinium-231	0.0000	U	0.159	0.159	1.43	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Protactinium-234	0.04119	U	0.115	0.115	0.0917	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Radium-226	-0.03116	U	0.110	0.110	0.0922	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Radium-228	0.06643	U	0.143	0.143	0.0924	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Thallium-208	0.02663		0.0274	0.0276	0.0148	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Thorium-232	0.06643	U	0.143	0.143	0.0924	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Thorium-234	0.1103	U	0.280	0.281	0.658	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Thorium 228	0.01742	U	0.0743	0.0743	0.0597	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Uranium-235	-0.1233	U	0.162	0.162	0.299	pCi/g	10/13/20 17:40	11/04/20 13:20	1			
Uranium-238	0.1103	U	0.280	0.281	0.658	pCi/g	10/13/20 17:40	11/04/20 13:20	1			

Lab Sample ID: LCS 160-485412/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488178

Prep Batch: 485412

Analyte	Spike	LCS	LCS	Total		LOQ	DLC	Unit	%Rec	Limits
	Added	Result	Qual	Uncert.	(2σ+/-)					
Americium-241	96.4	95.12		9.97	0.487	pCi/g	99	87 - 116		
Cesium-137	26.8	25.14		2.67	0.0700	0.0906	pCi/g	94	87 - 120	
Cobalt-60	9.60	9.060		0.954	0.0570	0.658	pCi/g	94	87 - 115	

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QC Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-39748-1
 SDG: GJ46599787

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-39748-20 DU

Client Sample ID: HPPG-ESU-TU153A-020

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488532

Prep Batch: 485412

Analyte	Sample	Sample	DU	DU	Total		RER	Limit		
	Result	Qual	Result	Qual	(2σ+/-)	LOQ	DLC	Unit		
Actinium-227	0.00805	U	0.05205	U	0.272		0.269	pCi/g	0.05	1
Actinium 228	0.317		0.2003		0.0874		0.107	pCi/g	0.50	1
Bismuth-212	0.000	U	0.0000	U	0.302		0.545	pCi/g	0	1
Bismuth-214	0.201		0.1790	U	0.127		0.204	pCi/g	0.09	1
Cesium-137	0.00679	U	-0.04014	U	0.0444	0.0700	0.0541	pCi/g	0.41	1
Lead-210	1.49		0.9697		1.35		0.870	pCi/g	0.20	1
Lead-212	0.225		0.2100		0.0722		0.0381	pCi/g	0.09	1
Lead-214	0.266		0.2435		0.0999		0.0439	pCi/g	0.11	1
Potassium-40	5.40		7.492		1.58		0.218	pCi/g	0.64	1
Protactinium-231	0.000	U	0.6257	U	1.69		1.86	pCi/g	0.26	1
Protactinium-234	-0.0181	U	0.07403	U	0.230		0.187	pCi/g	0.26	1
Radium-226	0.201		0.1790	U	0.127	0.200	0.204	pCi/g	0.09	1
Radium-228	0.317		0.2003		0.0874		0.107	pCi/g	0.50	1
Thallium-208	0.0606		0.1074		0.0615		0.0257	pCi/g	0.40	1
Thorium-232	0.317		0.2003		0.0874		0.107	pCi/g	0.50	1
Thorium-234	0.313		-0.04743	U	0.0947		0.633	pCi/g	0.79	1
Thorium 228	0.225		0.2100		0.0722		0.0381	pCi/g	0.09	1
Uranium-235	-0.0108	U	-0.07639	U	0.160		0.353	pCi/g	0.17	1
Uranium-238	0.313		-0.04743	U	0.0947		0.633	pCi/g	0.79	1

Lab Sample ID: MB 160-485694/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488864

Prep Batch: 485694

Analyte	MB	MB	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Actinium-227	0.1034	U	0.138	0.138		0.136	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Actinium 228	0.1376		0.105	0.106		0.0508	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Bismuth-212	0.2256	U	0.443	0.444		0.329	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Bismuth-214	-0.01586	U	0.0255	0.0256		0.139	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Cesium-137	0.001115	U	0.0388	0.0388	0.0700	0.0318	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Lead-210	0.3139	U	0.849	0.850		0.670	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Lead-212	-0.0005721	U	0.0539	0.0539		0.0440	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Lead-214	-0.1104	U	0.104	0.105		0.0882	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Potassium-40	-0.1927	U	0.684	0.685		0.430	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Protactinium-231	0.0000	U	0.422	0.422		1.69	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Protactinium-234	0.05439	U	0.112	0.113		0.0958	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Radium-226	-0.01586	U	0.0255	0.0256	0.200	0.139	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Radium-228	0.1376		0.105	0.106		0.0508	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thallium-208	0.02110	U	0.0500	0.0500		0.0283	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thorium-232	0.1376		0.105	0.106		0.0508	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thorium-234	-0.2347	U	0.313	0.314		0.620	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thorium 228	-0.0005721	U	0.0539	0.0539		0.0440	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Uranium-235	0.08197	U	0.223	0.223		0.222	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Uranium-238	-0.2347	U	0.313	0.314		0.620	pCi/g	10/14/20 13:40	11/11/20 16:35	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-485694/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488866

Prep Batch: 485694

Analyte	Spike Added	LCS		Total		DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)	LOQ				
Americium-241	96.4	94.50		9.91		0.485	pCi/g	98	87 - 116
Cesium-137	26.8	25.36		2.70	0.0700	0.0853	pCi/g	95	87 - 120
Cobalt-60	9.58	8.732		0.919		0.0432	pCi/g	91	87 - 115

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Rad

Leach Batch: 485037

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-1	HPPG-ESU-TU153A-001	Total/NA	Solid	Dry and Grind	
160-39748-2	HPPG-ESU-TU153A-002	Total/NA	Solid	Dry and Grind	
160-39748-3	HPPG-ESU-TU153A-003	Total/NA	Solid	Dry and Grind	
160-39748-4	HPPG-ESU-TU153A-004	Total/NA	Solid	Dry and Grind	
160-39748-5	HPPG-ESU-TU153A-005	Total/NA	Solid	Dry and Grind	
160-39748-6	HPPG-ESU-TU153A-006	Total/NA	Solid	Dry and Grind	
160-39748-7	HPPG-ESU-TU153A-007	Total/NA	Solid	Dry and Grind	
160-39748-8	HPPG-ESU-TU153A-008	Total/NA	Solid	Dry and Grind	
160-39748-9	HPPG-ESU-TU153A-009	Total/NA	Solid	Dry and Grind	
160-39748-10	HPPG-ESU-TU153A-010	Total/NA	Solid	Dry and Grind	
160-39748-11	HPPG-ESU-TU153A-011	Total/NA	Solid	Dry and Grind	
160-39748-12	HPPG-ESU-TU153A-012	Total/NA	Solid	Dry and Grind	
160-39748-13	HPPG-ESU-TU153A-013	Total/NA	Solid	Dry and Grind	
160-39748-14	HPPG-ESU-TU153A-014	Total/NA	Solid	Dry and Grind	
160-39748-15	HPPG-ESU-TU153A-015	Total/NA	Solid	Dry and Grind	
160-39748-16	HPPG-ESU-TU153A-016	Total/NA	Solid	Dry and Grind	
160-39748-17	HPPG-ESU-TU153A-017	Total/NA	Solid	Dry and Grind	
160-39748-18	HPPG-ESU-TU153A-018	Total/NA	Solid	Dry and Grind	
160-39748-19	HPPG-ESU-TU153A-019	Total/NA	Solid	Dry and Grind	
160-39748-20	HPPG-ESU-TU153A-020	Total/NA	Solid	Dry and Grind	
160-39748-21	HPPG-ESU-TU153A-021	Total/NA	Solid	Dry and Grind	
160-39748-22	HPPG-ESU-TU153A-022	Total/NA	Solid	Dry and Grind	
160-39748-23	HPPG-ESU-TU153A-023	Total/NA	Solid	Dry and Grind	
160-39748-24	HPPG-ESU-TU153A-024	Total/NA	Solid	Dry and Grind	
160-39748-1 DU	HPPG-ESU-TU153A-001	Total/NA	Solid	Dry and Grind	
160-39748-20 DU	HPPG-ESU-TU153A-020	Total/NA	Solid	Dry and Grind	
160-39748-22 DU	HPPG-ESU-TU153A-022	Total/NA	Solid	Dry and Grind	

Leach Batch: 485218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-27	HPPG-F-004	Total/NA	Solid	Dry and Grind	

Leach Batch: 485225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-25	HPPG-ESU-TU153A-025	Total/NA	Solid	Dry and Grind	
160-39748-26	HPPG-F-003	Total/NA	Solid	Dry and Grind	

Prep Batch: 485412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-1	HPPG-ESU-TU153A-001	Total/NA	Solid	Fill_Geo-21	485037
160-39748-2	HPPG-ESU-TU153A-002	Total/NA	Solid	Fill_Geo-21	485037
160-39748-3	HPPG-ESU-TU153A-003	Total/NA	Solid	Fill_Geo-21	485037
160-39748-4	HPPG-ESU-TU153A-004	Total/NA	Solid	Fill_Geo-21	485037
160-39748-5	HPPG-ESU-TU153A-005	Total/NA	Solid	Fill_Geo-21	485037
160-39748-6	HPPG-ESU-TU153A-006	Total/NA	Solid	Fill_Geo-21	485037
160-39748-7	HPPG-ESU-TU153A-007	Total/NA	Solid	Fill_Geo-21	485037
160-39748-8	HPPG-ESU-TU153A-008	Total/NA	Solid	Fill_Geo-21	485037
160-39748-9	HPPG-ESU-TU153A-009	Total/NA	Solid	Fill_Geo-21	485037
160-39748-10	HPPG-ESU-TU153A-010	Total/NA	Solid	Fill_Geo-21	485037
160-39748-11	HPPG-ESU-TU153A-011	Total/NA	Solid	Fill_Geo-21	485037
160-39748-12	HPPG-ESU-TU153A-012	Total/NA	Solid	Fill_Geo-21	485037

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Rad (Continued)

Prep Batch: 485412 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-13	HPPG-ESU-TU153A-013	Total/NA	Solid	Fill_Geo-21	485037
160-39748-14	HPPG-ESU-TU153A-014	Total/NA	Solid	Fill_Geo-21	485037
160-39748-15	HPPG-ESU-TU153A-015	Total/NA	Solid	Fill_Geo-21	485037
160-39748-16	HPPG-ESU-TU153A-016	Total/NA	Solid	Fill_Geo-21	485037
160-39748-17	HPPG-ESU-TU153A-017	Total/NA	Solid	Fill_Geo-21	485037
160-39748-18	HPPG-ESU-TU153A-018	Total/NA	Solid	Fill_Geo-21	485037
160-39748-19	HPPG-ESU-TU153A-019	Total/NA	Solid	Fill_Geo-21	485037
160-39748-20	HPPG-ESU-TU153A-020	Total/NA	Solid	Fill_Geo-21	485037
MB 160-485412/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-485412/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-39748-20 DU	HPPG-ESU-TU153A-020	Total/NA	Solid	Fill_Geo-21	485037

Prep Batch: 485694

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-21	HPPG-ESU-TU153A-021	Total/NA	Solid	Fill_Geo-21	485037
160-39748-22	HPPG-ESU-TU153A-022	Total/NA	Solid	Fill_Geo-21	485037
160-39748-23	HPPG-ESU-TU153A-023	Total/NA	Solid	Fill_Geo-21	485037
160-39748-24	HPPG-ESU-TU153A-024	Total/NA	Solid	Fill_Geo-21	485037
160-39748-25	HPPG-ESU-TU153A-025	Total/NA	Solid	Fill_Geo-21	485225
160-39748-26	HPPG-F-003	Total/NA	Solid	Fill_Geo-21	485225
160-39748-27	HPPG-F-004	Total/NA	Solid	Fill_Geo-21	485218
MB 160-485694/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-485694/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 486072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-1	HPPG-ESU-TU153A-001	Total/NA	Solid	DPS-0	485037
160-39748-2	HPPG-ESU-TU153A-002	Total/NA	Solid	DPS-0	485037
160-39748-3	HPPG-ESU-TU153A-003	Total/NA	Solid	DPS-0	485037
160-39748-4	HPPG-ESU-TU153A-004	Total/NA	Solid	DPS-0	485037
160-39748-5	HPPG-ESU-TU153A-005	Total/NA	Solid	DPS-0	485037
160-39748-6	HPPG-ESU-TU153A-006	Total/NA	Solid	DPS-0	485037
160-39748-7	HPPG-ESU-TU153A-007	Total/NA	Solid	DPS-0	485037
160-39748-8	HPPG-ESU-TU153A-008	Total/NA	Solid	DPS-0	485037
160-39748-9	HPPG-ESU-TU153A-009	Total/NA	Solid	DPS-0	485037
160-39748-10	HPPG-ESU-TU153A-010	Total/NA	Solid	DPS-0	485037
160-39748-11	HPPG-ESU-TU153A-011	Total/NA	Solid	DPS-0	485037
160-39748-12	HPPG-ESU-TU153A-012	Total/NA	Solid	DPS-0	485037
160-39748-13	HPPG-ESU-TU153A-013	Total/NA	Solid	DPS-0	485037
160-39748-14	HPPG-ESU-TU153A-014	Total/NA	Solid	DPS-0	485037
160-39748-15	HPPG-ESU-TU153A-015	Total/NA	Solid	DPS-0	485037
160-39748-16	HPPG-ESU-TU153A-016	Total/NA	Solid	DPS-0	485037
160-39748-17	HPPG-ESU-TU153A-017	Total/NA	Solid	DPS-0	485037
160-39748-18	HPPG-ESU-TU153A-018	Total/NA	Solid	DPS-0	485037
160-39748-19	HPPG-ESU-TU153A-019	Total/NA	Solid	DPS-0	485037
160-39748-20	HPPG-ESU-TU153A-020	Total/NA	Solid	DPS-0	485037
160-39748-21	HPPG-ESU-TU153A-021	Total/NA	Solid	DPS-0	485037
MB 160-486072/24-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-486072/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	
160-39748-1 DU	HPPG-ESU-TU153A-001	Total/NA	Solid	DPS-0	485037

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Rad

Prep Batch: 486247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-22	HPPG-ESU-TU153A-022	Total/NA	Solid	DPS-0	485037
160-39748-23	HPPG-ESU-TU153A-023	Total/NA	Solid	DPS-0	485037
160-39748-24	HPPG-ESU-TU153A-024	Total/NA	Solid	DPS-0	485037
160-39748-25	HPPG-ESU-TU153A-025	Total/NA	Solid	DPS-0	485225
160-39748-26	HPPG-F-003	Total/NA	Solid	DPS-0	485225
160-39748-27	HPPG-F-004	Total/NA	Solid	DPS-0	485218
LCS 160-486247/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	
160-39748-22 DU	HPPG-ESU-TU153A-022	Total/NA	Solid	DPS-0	485037

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

Page 103 of 153

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-1
SDG: GJ46599787

Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Sr (40-110)
160-39748-1	HPPG-ESU-TU153A-001	88.8
160-39748-1 DU	HPPG-ESU-TU153A-001	106
160-39748-2	HPPG-ESU-TU153A-002	93.6
160-39748-3	HPPG-ESU-TU153A-003	94.9
160-39748-4	HPPG-ESU-TU153A-004	91.5
160-39748-5	HPPG-ESU-TU153A-005	97.0
160-39748-6	HPPG-ESU-TU153A-006	89.0
160-39748-7	HPPG-ESU-TU153A-007	89.9
160-39748-8	HPPG-ESU-TU153A-008	89.2
160-39748-9	HPPG-ESU-TU153A-009	90.7
160-39748-10	HPPG-ESU-TU153A-010	92.0
160-39748-11	HPPG-ESU-TU153A-011	83.5
160-39748-12	HPPG-ESU-TU153A-012	91.7
160-39748-13	HPPG-ESU-TU153A-013	91.3
160-39748-14	HPPG-ESU-TU153A-014	93.4
160-39748-15	HPPG-ESU-TU153A-015	92.7
160-39748-16	HPPG-ESU-TU153A-016	89.9
160-39748-17	HPPG-ESU-TU153A-017	87.3
160-39748-18	HPPG-ESU-TU153A-018	87.0
160-39748-19	HPPG-ESU-TU153A-019	92.1
160-39748-20	HPPG-ESU-TU153A-020	86.9
160-39748-21	HPPG-ESU-TU153A-021	92.5
160-39748-22	HPPG-ESU-TU153A-022	101
160-39748-22 DU	HPPG-ESU-TU153A-022	97.1
160-39748-23	HPPG-ESU-TU153A-023	93.2
160-39748-24	HPPG-ESU-TU153A-024	92.1
160-39748-25	HPPG-ESU-TU153A-025	92.8
160-39748-26	HPPG-F-003	94.9
160-39748-27	HPPG-F-004	87.9
LCS 160-486072/1-A	Lab Control Sample	99.3
LCS 160-486247/1-A	Lab Control Sample	96.5
MB 160-486072/24-A	Method Blank	95.3

Tracer/Carrier Legend

Sr = Sr Carrier

Eurofins TestAmerica, St. Louis



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-39748-3
Laboratory Sample Delivery Group: GJ46599787
Client Project/Site: HPNS-Parcel G 501197

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
1/5/2021 12:28:52 PM

Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Job ID: 160-39748-3

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-39748-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 10/05/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at

Case Narrative

Page 107 of 153

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Job ID: 160-39748-3 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 16.7 C.

Additional analysis requested by the client and not listed on the COC.

ISOTOPIC PLUTONIUM (ALPHA SPECTROMETRY)

Samples HPPG-ESU-TU153A-001 (160-39748-1), HPPG-ESU-TU153A-011 (160-39748-11) and HPPG-ESU-TU153A-021 (160-39748-21) were analyzed for Isotopic Plutonium (Alpha Spectrometry) in accordance with A-01-R. The samples were dried on 10/07/2020, prepared on 12/08/2020 and analyzed on 12/29/2020.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491191/1-A)

The detection goal was not met, apparently due to the sample being counted on a detector with higher background, causing the DLC to be raised. The sample result is well below the client requested limit (actually negative), even considering the total propagated uncertainty (TPU). The laboratory does not believe this excursion significantly affects the data. HPPG-ESU-TU153A-021 (160-39748-21)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples HPPG-ESU-TU153A-001 (160-39748-1), HPPG-ESU-TU153A-011 (160-39748-11) and HPPG-ESU-TU153A-021 (160-39748-21) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 10/07/2020, prepared on 12/08/2020 and analyzed on 12/29/2020.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491192/1-A)

A detector (AV119) which failed for energy centroid was inadvertently used to count the sample planchet (160-39748-A-11-G). However, the energy centroid of the U-232 tracer is within QC limits demonstrating acceptable performance of the detector at the time of sample count. The laboratory does not believe this excursion adversely affects the result. HPPG-ESU-TU153A-011 (160-39748-11)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



ESTRIDIOL 31

4006 Bell Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # 501197RSY-003
Page 1 of 4

Ref. Document # 501197RSY-003

Project Number: 501197		Analysis Requested																																																																																					
Project Manager: Lisa Bercik Phone #: (619)213-3389 Send Report to: Rose Corlett Phone/Fax Number: 415-987-0760 Address: 4005 Point Chicago Hwy		Hunters Point Naval Shipyard: Parcel G Remedial Action																																																																																					
Project Location: San Francisco, CA Purchase Order #: 1153058 Shipment/Pickup Date: 10/2/2020 Waybill Number: 4157 03235 2C74		Gemma Spec (EPA 901.1 M) - Full 21 day in growth gamma																																																																																					
Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046		Total Strontium (EPA 905 MOD)																																																																																					
Lab Contact Name/ph #: Rhonda Ridenbower (314)298-8566 Sample Lead: Lewis, Devin Sample Tech(s): Joaquin Ramirez		Strontium-90 (EPA 905 MOD)																																																																																					
<table border="1"> <thead> <tr> <th colspan="4">Collection Information</th> <th colspan="4">Preservatives (water)</th> </tr> <tr> <th>Sample ID</th> <th>Date</th> <th>Time</th> <th>Method</th> <th># of Containers</th> <th># of Container Type</th> <th>Preservative</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>HPPG-ESU-TU15AA-001</td> <td>10/17/2020</td> <td>13:05</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-002</td> <td>10/14/2020</td> <td>13:25</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-003</td> <td>10/11/2020</td> <td>14:07</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-004</td> <td>10/12/2020</td> <td>13:50</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-005</td> <td>10/11/2020</td> <td>14:03</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-006</td> <td>10/11/2020</td> <td>14:31</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-007</td> <td>10/11/2020</td> <td>14:37</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> <tr> <td>HPPG-ESU-TU15AA-008</td> <td>10/11/2020</td> <td>14:42</td> <td>G</td> <td>SO</td> <td>1</td> <td>16 oz. plastic jar</td> <td>X</td> </tr> </tbody> </table>								Collection Information				Preservatives (water)				Sample ID	Date	Time	Method	# of Containers	# of Container Type	Preservative	Comment	HPPG-ESU-TU15AA-001	10/17/2020	13:05	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-002	10/14/2020	13:25	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-003	10/11/2020	14:07	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-004	10/12/2020	13:50	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-005	10/11/2020	14:03	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-006	10/11/2020	14:31	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-007	10/11/2020	14:37	G	SO	1	16 oz. plastic jar	X	HPPG-ESU-TU15AA-008	10/11/2020	14:42	G	SO	1	16 oz. plastic jar	X
Collection Information				Preservatives (water)																																																																																			
Sample ID	Date	Time	Method	# of Containers	# of Container Type	Preservative	Comment																																																																																
HPPG-ESU-TU15AA-001	10/17/2020	13:05	G	SO	1	16 oz. plastic jar	X																																																																																
HPPG-ESU-TU15AA-002	10/14/2020	13:25	G	SO	1	16 oz. plastic jar	X																																																																																
HPPG-ESU-TU15AA-003	10/11/2020	14:07	G	SO	1	16 oz. plastic jar	X																																																																																
HPPG-ESU-TU15AA-004	10/12/2020	13:50	G	SO	1	16 oz. plastic jar	X																																																																																
HPPG-ESU-TU15AA-005	10/11/2020	14:03	G	SO	1	16 oz. plastic jar	X																																																																																
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HPPG-ESU-TU15AA-008	10/11/2020	14:42	G	SO	1	16 oz. plastic jar	X																																																																																
<p>Special Instructions:</p> <p>Analyze for Total Strontium as a screening step, and Isotopic Sr-80 only if Total Strontium is above project action limit of 0.334 pCi/lg</p> <p>21 day ingrowth results only</p> <p>Turaround Time: 3-day <input type="checkbox"/> 10-Day <input type="checkbox"/> 28-day <input type="checkbox"/> Other <input type="checkbox"/></p> <p>Level of QC Required: I II III Project Specific</p> <p>Relinquisher Signature: Received By: Received Signature: Receive Date Time:</p> <p>Method Codes: C = Composite, G = Grab Matrix Codes: DW = Drinking Water; SW = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Absorbents; PG = Pipe Opening</p>																																																																																							
Relinquished By: Michael Chaffell		Relinquish Date Time: 10/02/2020 13:01		Joaquin Ramirez		10/02/2020 13:01																																																																																	
Locked Storage (R Kilpack)		Michael Chaffell		Joaquin Ramirez		10/02/2020 13:01																																																																																	
Locked Storage (R Kilpack)		Joaquin Ramirez		Joaquin Ramirez		10/02/2020 13:01																																																																																	
				SHIPPED COLAB		Joaquin Ramirez																																																																																	

*** Last 3 transfers shown above - Complete list of transfers on last page ***



CHAIN OF CUSTODY

Ref. Document # 501197RSY-003

APTM Federal Services, LLC
4005 Port Chicago Hwy
Concord, CA 94520

Project Number: 501197		Hunters Point Naval Shipyard: Parcel		Analysis Requested	
Project Location: San Francisco, CA					
Purchase Order #: 1153068					
Shipment/Pickup Date: 10/2/2020					
Sample ID	Date	Time	Method	Matrix	
HPPG-ESU-TU153A-009	10/1/2020	15:07	G	SO	1
HPPG-ESU-TU153A-010	10/1/2020	15:13	G	SO	1
HPPG-ESU-TU153A-011	10/1/2020	15:20	G	SO	1
HPPG-ESU-TU153A-012	10/1/2020	15:45	G	SO	1
HPPG-ESU-TU153A-013	10/1/2020	15:50	G	SO	1
HPPG-ESU-TU153A-014	10/1/2020	16:00	G	SO	1
HPPG-ESU-TU153A-015	10/1/2020	16:02	G	SO	1
HPPG-ESU-TU153A-016	10/1/2020	16:04	G	SO	1
HPPG-ESU-TU153A-017	10/1/2020	16:48	G	SO	1
HPPG-ESU-TU153A-018	10/1/2020	16:35	G	SO	1
HPPG-ESU-TU153A-019	10/1/2020	16:10	G	SO	1
HPPG-ESU-TU153A-020	10/1/2020	16:01	G	SO	1
HPPG-ESU-TU153A-021	10/1/2020	16:55	G	SO	1
HPPG-ESU-TU153A-022	10/1/2020	16:20	G	SO	1
HPPG-ESU-TU153A-023	10/1/2020	16:16	G	SO	1
HPPG-ESU-TU153A-024	10/1/2020	16:23	G	SO	1
HPPG-ESU-TU153A-025	10/1/2020	16:10	G	SO	1



CHAIN OF CUSTODY

Ref. Document # 501197RSY-003

APTM Federal Services, LLC
4005 Park Chicago Hwy
Concord, CA 94520

Project Number:		501197		Analysis Requested	
Project Name:	G Remedial Action	Hunters Point Naval Shipyard; Parcel			
Project Location:	San Francisco, CA				
Purchase Order #:	1158058				
Shipment/Pickup Date:	10/2/2020				
Waybill Number:	4957 0235 2094				
Test Address:	13715 Rider Trail North				
Lab Destination:	Earth City, MO 63046				
Lab Contact Name/Ph #	Rhonda Ridenbower (314)298-8556				
Sample Lead:	Devin Lewis				
Sample Tech(s):	Joaquin Ramirez				
Andrew Murn	Sidney Vernon				
Collection Information					
Sample ID	Date	Time	Method	# of Containers	Container Type
HPPG-F-003	10/1/2020	14:42	G	SO 1	16 oz. plastic jar
HPPG-F-004	10/1/2020	16:20	G	SO 1	16 oz. plastic jar

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All Transfers for COC 501197RSY-003

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Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/01/2020 17:47	Locked Storage (RKlipack)		10/01/2020 17:47
Locked Storage (RKlipack)		10/02/2020 13:01	Joaquin Ramirez		10/02/2020 13:01
Locked Storage (RKlipack)		10/02/2020 13:01	Joaquin Ramirez		10/02/2020 13:01
Joaquin Ramirez		10/02/2020 13:18	ShippedOLAS		10/02/2020 08:02

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-39748-3
SDG Number: GJ46599787**Login Number:** 39748**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-39748-1	HPPG-ESU-TU153A-001	Solid	10/01/20 13:05	10/05/20 08:22	
160-39748-11	HPPG-ESU-TU153A-011	Solid	10/01/20 15:20	10/05/20 08:22	
160-39748-21	HPPG-ESU-TU153A-021	Solid	10/01/20 15:55	10/05/20 08:22	

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-001

Lab Sample ID: 160-39748-1

Date Collected: 10/01/20 13:05

Matrix: Solid

Date Received: 10/05/20 08:22

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-239/240	0.000	U	0.00963	0.00963	0.100	0.00792	pCi/g	12/08/20 18:08	12/29/20 09:30	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Pu-242 (T)	85.9		30 - 110					12/08/20 18:08	12/29/20 09:30	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235/236	0.0148		0.0156	0.0157	0.100	0.00812	pCi/g	12/08/20 18:27	12/29/20 15:25	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	88.2		30 - 110					12/08/20 18:27	12/29/20 15:25	1

Client Sample ID: HPPG-ESU-TU153A-011

Lab Sample ID: 160-39748-11

Date Collected: 10/01/20 15:20

Matrix: Solid

Date Received: 10/05/20 08:22

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-239/240	0.000	U	0.00555	0.00555	0.100	0.00457	pCi/g	12/08/20 18:08	12/29/20 09:30	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Pu-242 (T)	91.8		30 - 110					12/08/20 18:08	12/29/20 09:30	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235/236	0.0120		0.0127	0.0127	0.100	0.00557	pCi/g	12/08/20 18:27	12/29/20 15:24	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	91.3		30 - 110					12/08/20 18:27	12/29/20 15:24	1

Client Sample ID: HPPG-ESU-TU153A-021

Lab Sample ID: 160-39748-21

Date Collected: 10/01/20 15:55

Matrix: Solid

Date Received: 10/05/20 08:22

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-239/240	-0.0225	U	0.0158	0.0160	0.100	0.0172	pCi/g	12/08/20 18:08	12/29/20 09:30	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Pu-242 (T)	86.7		30 - 110					12/08/20 18:08	12/29/20 09:30	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Client Sample ID: HPPG-ESU-TU153A-021

Lab Sample ID: 160-39748-21

Date Collected: 10/01/20 15:55

Matrix: Solid

Date Received: 10/05/20 08:22

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235/236	0.0163		0.0168	0.0168	0.100	0.00937	pCi/g	12/08/20 18:27	12/29/20 15:24	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	93.7		30 - 110					12/08/20 18:27	12/29/20 15:24	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-491192/1-A

Matrix: Solid

Analysis Batch: 493438

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491192

Analyte	MB		Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB		Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235/236	0.002324	U		0.0154	0.0154	0.100	0.0121	pCi/g	12/08/20 18:27	12/29/20 15:25	1
<hr/>											
Tracer	MB	MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Uranium-232	110				30 - 110				12/08/20 18:27	12/29/20 15:25	1

Lab Sample ID: LCS 160-491192/2-A

Matrix: Solid

Analysis Batch: 493439

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 491192

Analyte	Spike		LCS	LCS	Total	LOQ	DLC	Unit	%Rec	Limits	%Rec.
	Added	Result			Uncert. (2σ+/-)						
Uranium-234		3.18		2.973	0.294	0.100	0.0114	pCi/g	93	84 - 120	
Uranium-238		3.26		3.045	0.299	0.100	0.00463	pCi/g	94	82 - 122	
<hr/>											
Tracer	LCS	LCS	%Yield	Qualifier	Limits						
Uranium-232	99.3				30 - 110						

Lab Sample ID: 160-39748-1 DU

Matrix: Solid

Analysis Batch: 493441

Client Sample ID: HPPG-ESU-TU153A-001

Prep Type: Total/NA

Prep Batch: 491192

Analyte	Sample		Sample	DU		DU	DU	Uncert.	(2σ+/-)	LOQ	DLC	Unit	RER	RER	Limit	
	Result	Qual		Result	Qual											
Uranium-235/23	0.0148			0.007313	U			0.0146		0.100	0.00982	pCi/g		0.25	1	
<hr/>																
Tracer	DU	DU	%Yield	Qualifier	Limits											
Uranium-232	86.0				30 - 110											

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: MB 160-491191/1-A

Matrix: Solid

Analysis Batch: 493386

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491191

Analyte	MB		MB	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB		Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-239/240	0.003831	U		0.00938	0.00939	0.100	0.00630	pCi/g	12/08/20 18:08	12/29/20 09:30	1
<hr/>											
Tracer	MB	MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Pu-242 (T)	93.0				30 - 110				12/08/20 18:08	12/29/20 09:30	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-491191/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 493387

Prep Batch: 491191

Analyte	Spike Added	LCS		LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Result	Qual						
Plutonium-239/2	2.64	2.491		0.250	0.100	0.00439	pCi/g	94	81 - 125		
<hr/>											
Tracer	%Yield	LCS	LCS	Qualifier	Limits						
Pu-242 (T)	97.0				30 - 110						

Lab Sample ID: 160-39748-1 DU

Client Sample ID: HPPG-ESU-TU153A-001

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 493390

Prep Batch: 491191

Analyte	Sample		Sample		DU		DU		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	RER	RER Limit	
	Result	Qual	Result	Qual	Result	Qual	Result	Qual							
Plutonium-239/2	0.000	U	-0.00192	U	0.00385	0.100	0.00447	pCi/g					0.14	1	
<hr/>															
Tracer	%Yield	DU	DU	Qualifier	Limits										
Pu-242 (T)	93.1				30 - 110										

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Rad

Leach Batch: 490786

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-1	HPPG-ESU-TU153A-001	Total/NA	Solid	Dry and Grind	
160-39748-11	HPPG-ESU-TU153A-011	Total/NA	Solid	Dry and Grind	
160-39748-21	HPPG-ESU-TU153A-021	Total/NA	Solid	Dry and Grind	
160-39748-1 DU	HPPG-ESU-TU153A-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 491191

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-1	HPPG-ESU-TU153A-001	Total/NA	Solid	ExtChrom	490786
160-39748-11	HPPG-ESU-TU153A-011	Total/NA	Solid	ExtChrom	490786
160-39748-21	HPPG-ESU-TU153A-021	Total/NA	Solid	ExtChrom	490786
MB 160-491191/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-491191/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-39748-1 DU	HPPG-ESU-TU153A-001	Total/NA	Solid	ExtChrom	490786

Prep Batch: 491192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39748-1	HPPG-ESU-TU153A-001	Total/NA	Solid	ExtChrom	490786
160-39748-11	HPPG-ESU-TU153A-011	Total/NA	Solid	ExtChrom	490786
160-39748-21	HPPG-ESU-TU153A-021	Total/NA	Solid	ExtChrom	490786
MB 160-491192/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-491192/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-39748-1 DU	HPPG-ESU-TU153A-001	Total/NA	Solid	ExtChrom	490786

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39748-3
SDG: GJ46599787

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Pu-242 (T)	Percent Yield (Acceptance Limits)				
		(30-110)					
160-39748-1	HPPG-ESU-TU153A-001	85.9					
160-39748-1 DU	HPPG-ESU-TU153A-001	93.1					
160-39748-11	HPPG-ESU-TU153A-011	91.8					
160-39748-21	HPPG-ESU-TU153A-021	86.7					
LCS 160-491191/2-A	Lab Control Sample	97.0					
MB 160-491191/1-A	Method Blank	93.0					

Pu-242 (T) = Pu-242 (T)

Method A

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
		U-232	
Lab Sample ID	Client Sample ID	(30-110)	
160-39748-1	HPPG-ESU-TU153A-001	88.2	
160-39748-1 DU	HPPG-ESU-TU153A-001	86.0	
160-39748-11	HPPG-ESU-TU153A-011	91.3	
160-39748-21	HPPG-ESU-TU153A-021	93.7	
LCS 160-491192/2-A	Lab Control Sample	99.3	
MB 160-491192/1-A	Method Blank	110	



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-39749-1
Laboratory Sample Delivery Group: D1189470
Client Project/Site: HPNS-Parcel G 501197
Revision: 2

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
4/7/2021 10:30:23 AM

Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Job ID: 160-39749-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-39749-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- Added Pa234 to gamma analyte list.

Revision 2- Additional information requested in case narrative for total strontium

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Job ID: 160-39749-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

RECEIPT

The samples were received on 10/05/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.7 C.

TOTAL BETA STRONTIUM (GFPC)

Sample HPPG-ESU-TU153A-B-001 (160-39749-1) was analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 10/09/2020, prepared on 10/20/2020 and analyzed on 11/09/2020.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP: HPPG-ESU-TU153A-B-001 (160-39749-1).

The method blank (MB) z-score is within limits and is stored in the level IV raw data.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample HPPG-ESU-TU153A-B-001 (160-39749-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/09/2020, prepared on 10/14/2020 and analyzed on 11/11/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.
HPPG-ESU-TU153A-B-001 (160-39749-1)

The method blank (MB) z-score associated with Prep Batch 160-485694 is within limits and is stored in the level IV raw data. (MB 160-485694/1-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s):

CHAIN OF CUSTODY

Ref. Document # 501197RSY-004

Page 1 of 2

Send Report to:	Rose Condit
Phone/Fax Number:	415-987-0760
Address:	4005 Port Chicago Hwy

Project Number: 501197 Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action Project Location: San Francisco, CA Purchase Order #: 1159058 Shipment/Pickup Date: 10/2/2020 Waybill Number: 4957 0225 2694 Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046						Analysis Requested						
Lab Contact Name/ph # Rhoeda Ridenbower (314)298-8566						Strontium-90 (EPA 905 M0D)	Total Strontium (EPA 305 M0D)	Day in growth gamma	Gamma Spec (EPA 801.1M) - Full 21	Dose Rate uR/Hr	Evidence Bag ID	Comment
						Preservatives (water)	Preservatives (soil)	# of Containers	Matrix			
Sample ID	Date	Time	Method			X	X	X		4	D1189470	
Special Instructions: 21 day ingrowth results only Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g												
Turnaround Time: 3-day <input type="checkbox"/> 10-Day <input type="checkbox"/> 28-day <input type="checkbox"/> Other <input type="checkbox"/>				Level of QC Required: I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> Project Specific								
Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening												

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/02/2020 11:50	Joaquin Ramirez		10/02/2020 11:50
Joaquin Ramirez		10/02/2020 13:17	SHIPPEDTOLAB		10/05/2020 0812

*** Last 3 transfers shown above - Complete list of transfers on last page ***



All Transfers for COC 501197RSY-004

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/02/2020 11:50	Joaquin Ramirez		10/02/2020 11:50
Joaquin Ramirez		10/02/2020 13:17	SHIPPEDTOLAB		10/02/2020 0822



Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-39749-1
SDG Number: D1189470**Login Number:** 39749**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, St. Louis

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-39749-1	HPPG-ESU-TU153A-B-001	Solid	10/02/20 11:34	10/05/20 08:22	

1
2
3
4
5
6
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8
9
10
11
12

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Client Sample ID: HPPG-ESU-TU153A-B-001

Lab Sample ID: 160-39749-1

Matrix: Solid

Date Collected: 10/02/20 11:34
Date Received: 10/05/20 08:22

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0591		0.0666	0.0668	0.160	0.0502	pCi/g	10/20/20 07:09	11/09/20 16:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	88.8		40 - 110					10/20/20 07:09	11/09/20 16:49	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.00708	U	0.482	0.482		0.300	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Actinium 228	0.165		0.213	0.214		0.115	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Bismuth-212	0.000	U	0.217	0.217		0.683	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Bismuth-214	0.400		0.128	0.137		0.0511	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Cesium-137	-0.0512	U	0.0748	0.0751	0.0700	0.0748	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Lead-210	1.26		1.40	1.41		0.914	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Lead-212	0.300		0.0903	0.0969		0.0531	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Lead-214	0.265		0.107	0.111		0.0512	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Potassium-40	7.05		1.39	1.60		0.376	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Protactinium-231	-0.819	U	2.26	2.26		1.83	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Protactinium-234	0.0166	U	0.0136	0.0137		0.257	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Radium-226	0.400		0.128	0.137	0.200	0.0511	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Radium-228	0.165		0.213	0.214		0.115	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thallium-208	0.0803		0.0942	0.0947		0.0533	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thorium-232	0.165		0.213	0.214		0.115	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thorium-234	0.493		0.574	0.577		0.399	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Thorium 228	0.300		0.0903	0.0969		0.0531	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Uranium-235	-0.0106	U	0.324	0.324		0.459	pCi/g	10/14/20 13:40	11/11/20 17:50	1
Uranium-238	0.493		0.574	0.577		0.399	pCi/g	10/14/20 13:40	11/11/20 17:50	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-486247/24-A

Matrix: Solid

Analysis Batch: 488625

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 486247

Analyte	Result	MB MB MB	MB MB MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Total Beta Strontium	0.05901			0.0645	0.0646	0.160	pCi/g	10/20/20 07:09	11/09/20 16:51	1
Carrier		%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Sr Carrier	94.2			40 - 110				10/20/20 07:09	11/09/20 16:51	1

Lab Sample ID: LCS 160-486247/1-A

Matrix: Solid

Analysis Batch: 488624

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 486247

Analyte	Spike Added	LCS Result	LCS Qual	Count	Total	DLC	Unit	%Rec	%Rec. Limits	
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Total Beta Strontium	7.78	6.438		0.528	0.528	0.160	pCi/g	83	75 - 125	
Carrier		%Yield	Qualifier	Limits						
Sr Carrier	96.5			40 - 110						

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-485694/1-A

Matrix: Solid

Analysis Batch: 488864

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 485694

Analyte	Result	MB MB MB	MB MB MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Actinium-227	0.1034	U		0.138	0.138	0.136	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Actinium 228	0.1376			0.105	0.106	0.0508	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Bismuth-212	0.2256	U		0.443	0.444	0.329	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Bismuth-214	-0.01586	U		0.0255	0.0256	0.139	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Cesium-137	0.001115	U		0.0388	0.0388	0.0318	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Lead-210	0.3139	U		0.849	0.850	0.670	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Lead-212	-0.0005721	U		0.0539	0.0539	0.0440	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Lead-214	-0.1104	U		0.104	0.105	0.0882	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Potassium-40	-0.1927	U		0.684	0.685	0.430	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Protactinium-231	0.0000	U		0.422	0.422	1.69	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Protactinium-234	0.05439	U		0.112	0.113	0.0958	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Radium-226	-0.01586	U		0.0255	0.0256	0.139	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Radium-228	0.1376			0.105	0.106	0.0508	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thallium-208	0.02110	U		0.0500	0.0500	0.0283	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thorium-232	0.1376			0.105	0.106	0.0508	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thorium-234	-0.2347	U		0.313	0.314	0.620	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Thorium 228	-0.0005721	U		0.0539	0.0539	0.0440	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Uranium-235	0.08197	U		0.223	0.223	0.222	pCi/g	10/14/20 13:40	11/11/20 16:35	1
Uranium-238	-0.2347	U		0.313	0.314	0.620	pCi/g	10/14/20 13:40	11/11/20 16:35	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-485694/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488866

Prep Batch: 485694

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	LOQ	Total		%Rec.	Limits
		Result	Qual			DLC	Unit		
Americium-241	96.4	94.50		9.91		0.485	pCi/g	98	87 - 116
Cesium-137	26.8	25.36		2.70	0.0700	0.0853	pCi/g	95	87 - 120
Cobalt-60	9.58	8.732		0.919		0.0432	pCi/g	91	87 - 115

Lab Sample ID: 160-39749-1 DU

Client Sample ID: HPPG-ESU-TU153A-B-001

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488864

Prep Batch: 485694

Analyte	Sample	Sample	DU	DU	Total	RER	Limit				
	Result	Qual	Result	Qual	Uncert. (2σ+/-)	LOQ	DLC	Unit			
Actinium-227	0.00708	U			0.06735	U	0.177			0.09	1
Actinium-228	0.165				0.2810		0.109			0.36	1
Bismuth-212	0.000	U			0.1916	U	0.453			0.29	1
Bismuth-214	0.400				0.3280		0.0948			0.31	1
Cesium-137	-0.0512	U			0.007354	U	0.0274	0.0700	0.0216 pCi/g	0.57	1
Lead-210	1.26				-0.3884	U	1.03			0.68	1
Lead-212	0.300				0.2449		0.0671			0.33	1
Lead-214	0.265				0.3303		0.0949			0.31	1
Potassium-40	7.05				7.167		1.24			0.04	1
Protactinium-231	-0.819	U			0.2266	U	0.908			0.33	1
Protactinium-234	0.0166	U			0.01456	U	0.0261			0.05	1
Radium-226	0.400				0.3280		0.0948	0.200	0.0340 pCi/g	0.31	1
Radium-228	0.165				0.2810		0.109			0.36	1
Thallium-208	0.0803				0.1159		0.0386			0.27	1
Thorium-232	0.165				0.2810		0.109			0.36	1
Thorium-234	0.493				-0.2768	U	0.459			0.74	1
Thorium-228	0.300				0.2449		0.0671			0.33	1
Uranium-235	-0.0106	U			0.08075	U	0.181			0.18	1
Uranium-238	0.493				-0.2768	U	0.459			0.74	1

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Rad

Leach Batch: 485218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Dry and Grind	
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Dry and Grind	
160-39749-1 DU	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 485694

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Fill_Geo-21	
MB 160-485694/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-485694/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-39749-1 DU	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Fill_Geo-21	485218

Prep Batch: 486247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	DPS-0	
MB 160-486247/24-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-486247/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	485218

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-1
SDG: D1189470

Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-39749-1	HPPG-ESU-TU153A-B-001	88.8	
LCS 160-486247/1-A	Lab Control Sample	96.5	
MB 160-486247/24-A	Method Blank	94.2	

Tracer/Carrier Legend

Sr = Sr Carrier

Eurofins TestAmerica, St. Louis



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-39749-3
Laboratory Sample Delivery Group: D1189470
Client Project/Site: HPNS-Parcel G 501197

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
12/29/2020 3:20:47 PM

Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Job ID: 160-39749-3

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-39749-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 10/05/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Job ID: 160-39749-3 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 16.7 C.

Additional analysis, isotopic plutonium and uranium, were added by the client and not listed on the COC.

ISOTOPIC PLUTONIUM (ALPHA SPECTROMETRY)

Sample HPPG-ESU-TU153A-B-001 (160-39749-1) was analyzed for Isotopic Plutonium (Alpha Spectrometry) in accordance with A-01-R. The samples were dried on 10/09/2020, prepared on 12/15/2020 and analyzed on 12/22/2020.

Manual Integrations and adjustments to Regions of Interest (ROI) were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report. (Pulsers were left on during analysis) HPPG-ESU-TU153A-B-001 (160-39749-1) and (160-39749-A-1-N DU)

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491941/1-A).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Sample HPPG-ESU-TU153A-B-001 (160-39749-1) was analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 10/09/2020, prepared on 12/15/2020 and analyzed on 12/22/2020.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491942/1-A).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



APTM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520

Project Manager: Lisa Bercik
Phone #: (619)213-3389

Send Report to: Rose Condit
Phone/Fax Number: 416-987-
0760
Address: 4005 Port Chicago
Hwy

Sample Lead: Lewis, Devin
Sample Tech(s):

CHAIN OF CUSTODY

Ref Document # 501197RSY-004

Page 1 of 2

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Project Number:	501197			Analysis Requested		
Project Name:	Hunter's Point Naval Shipyard: Parcel G Remedial Action					
Project Location:	San Francisco, CA			160-39719 Chain of Custody		
Purchase Order #:	1158058					
Shipment/Pickup Date:	10/22/2020					
Waybill Number:	4957 0225 2034					
Lab Destination:	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046					
Lab Contact Name/ph #	Rhonda Ridenhower (314)298-8586					
	Gamma Spec (EPA 901.1M) - Full 21 day in growth gamma			Strontium-90 (EPA 905 MOD)		
	Gamma Spec (EPA 901.1M) - Full 21 day in growth gamma			Dose Rate uR/hr	Evidence Bag ID	Comment
	Preservatives (water)					
	Preservatives (soil)					
	# of Containers					
	Container Type					
Collection Information	Date	Time	Method			
Sample ID	10/2/2020	11:34	G	50	1	16 oz. plastic jar
HPPC ESU-TU153A-S-001				X	X	4
						D1189470
Special Instructions:	Analyze for Total Strontium as a screening step, and isotopic Sr-80 only if Total Strontium is above project action limit of 0.331 pCi/g					
Turnaround Time:	3-day <input type="checkbox"/>	10-Day <input type="checkbox"/>	28-day <input type="checkbox"/>	Other <input type="checkbox"/>	Level of QC Required:	
Method Codes: C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; St = Sludge; WW = Waste Water; CP = Chip Samples; A = Air ; ABS = Asbestos; PO = Pipe Opening					I	II
Relinquished By:	Relinquisher Signature:			Received By:		
Lewis, Devin				Joaquin Ramirez		
Joaquin Ramirez				SHIPPED TO LAB		
*** Last 3 transfers shown above - Complete list of transfers on last page						

All Transfers for COC 501197RSY-004

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/02/2020 11:50	Joaquin Ramirez		10/02/2020 11:50
Joaquin Ramirez		10/02/2020 13:17	SHIPPEDLAB		10/02/2020 0822

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-39749-3
SDG Number: D1189470**Login Number:** 39749**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, St. Louis

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-39749-1	HPPG-ESU-TU153A-B-001	Solid	10/02/20 11:34	10/05/20 08:22	

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Client Sample ID: HPPG-ESU-TU153A-B-001**Lab Sample ID: 160-39749-1**

Date Collected: 10/02/20 11:34

Matrix: Solid

Date Received: 10/05/20 08:22

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Plutonium-239/240	-0.00771	U	0.0134	0.0134	0.100	0.0127	pCi/g	12/15/20 14:09	12/22/20 11:17	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Pu-242 (T)	99.9		30 - 110					12/15/20 14:09	12/22/20 11:17	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-235/236	0.00745	U	0.0131	0.0132	0.100	0.00817	pCi/g	12/15/20 14:14	12/22/20 16:27	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	85.6		30 - 110					12/15/20 14:14	12/22/20 16:27	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-491942/1-A

Matrix: Solid

Analysis Batch: 492938

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491942

Analyte	MB		Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Uncert.		(2σ+/-)	Uncert.						
Uranium-235/236	0.004866	U		0.00688	0.00689	0.100	0.00566	pCi/g	12/15/20 14:14	12/22/20 16:27	1
<hr/>											
Tracer	MB	MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Uranium-232	91.7				30 - 110				12/15/20 14:14	12/22/20 16:27	1

Lab Sample ID: LCS 160-491942/2-A

Matrix: Solid

Analysis Batch: 492939

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 491942

Analyte	Spike		LCS Result	LCS Qual	Total	LOQ	DLC	Unit	%Rec	Limits	%Rec.
	Added	Result			Uncert.						
Uranium-234	3.18	3.207			0.315	0.100	0.00684	pCi/g	101	84 - 120	
Uranium-238	3.26	3.201			0.315	0.100	0.00836	pCi/g	98	82 - 122	
<hr/>											
Tracer	LCS	LCS	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Uranium-232	87.1				30 - 110				12/15/20 14:14	12/22/20 16:27	1

Lab Sample ID: 160-39749-1 DU

Matrix: Solid

Analysis Batch: 492941

Client Sample ID: HPPG-ESU-TU153A-B-001

Prep Type: Total/NA

Prep Batch: 491942

Analyte	Sample		DU		Total	LOQ	DLC	Unit	RER	Limit	
	Result	Qual	Result	Qual	Uncert.						
Uranium-235/23	0.00745	U			0.007399	0.00857	0.100	0.00574	pCi/g	0	1
<hr/>											
Tracer	DU	DU	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Uranium-232	91.7				30 - 110				12/15/20 14:09	12/22/20 11:17	1

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: MB 160-491941/1-A

Matrix: Solid

Analysis Batch: 492851

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491941

Analyte	MB		MB		Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Uncert.	Result	Uncert.	(2σ+/-)	(2σ+/-)						
Plutonium-239/240	-0.002096	U			0.0111	0.0111	0.100	0.00975	pCi/g	12/15/20 14:09	12/22/20 11:17	1
<hr/>												
Tracer	MB	MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
Pu-242 (T)	102				30 - 110				12/15/20 14:09	12/22/20 11:17	1	

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-491941/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 492852

Prep Batch: 491941

Analyte	Spike Added	LCS		LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Result	Qual						
Plutonium-239/2 40	2.64	2.686		0.268	0.100	0.0172	pCi/g	102	81 - 125		
Tracer											
Pu-242 (T)	110			30 - 110							

Lab Sample ID: 160-39749-1 DU

Client Sample ID: HPPG-ESU-TU153A-B-001

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 492855

Prep Batch: 491941

Analyte	Sample		Sample		DU		DU		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Result	Qual	Result	Qual						
Plutonium-239/2 40	-0.00771	U	0.004050	U	0.0115	0.100	0.00816	pCi/g	0.0115	0.100	0.00816	pCi/g	0.47	1
Tracer														
Pu-242 (T)	84.9		30 - 110											

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Rad

Leach Batch: 490788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Dry and Grind	
160-39749-1 DU	HPPG-ESU-TU153A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 491941

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	ExtChrom	490788
MB 160-491941/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-491941/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-39749-1 DU	HPPG-ESU-TU153A-B-001	Total/NA	Solid	ExtChrom	490788

Prep Batch: 491942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39749-1	HPPG-ESU-TU153A-B-001	Total/NA	Solid	ExtChrom	490788
MB 160-491942/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-491942/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-39749-1 DU	HPPG-ESU-TU153A-B-001	Total/NA	Solid	ExtChrom	490788

Tracer/Carrier Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39749-3
SDG: D1189470

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Pu-242 (T) (30-110)	
160-39749-1	HPPG-ESU-TU153A-B-001	99.9	
160-39749-1 DU	HPPG-ESU-TU153A-B-001	84.9	
LCS 160-491941/2-A	Lab Control Sample	110	
MB 160-491941/1-A	Method Blank	102	

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Percent Yield (Acceptance Limits)		
Lab Sample ID	Client Sample ID	U-232 (30-110)
160-39749-1	HPPG-ESU-TU153A-B-001	85.6
160-39749-1 DU	HPPG-ESU-TU153A-B-001	91.7
LCS 160-491942/2-A	Lab Control Sample	87.1

Trooper/Corridor Legend

Hacel/Carrier Legelli

From: [Ridenhower, Rhonda](#)
To: [Condit, Rose](#)
Cc: [Engel, Audrey](#); [Ramirez, Joaquin](#)
Subject: RE: Parcel G Alpha Spec request
Date: Wednesday, December 2, 2020 9:19:43 PM

EXTERNAL SENDER

Rose,

All samples have had Iso U and Pu added. I will post the sample confirmation in the morning.

Thank you,
Rhonda

Rhonda Ridenhower
Client Service Manager

Phone: 314-298-8566
Direct: 314-787-8227

E-mail: Rhonda.Ridenhower@eurofinset.com

From: Condit, Rose <rose.condit@aptim.com>
Sent: Wednesday, December 2, 2020 6:36 PM
To: Ridenhower, Rhonda <Rhonda.Ridenhower@Eurofinset.com>
Cc: Engel, Audrey <Audrey.Engel@aptim.com>; Ramirez, Joaquin <Joaquin.Ramirez@aptim.com>
Subject: Parcel G Alpha Spec request

EXTERNAL EMAIL*

Hi Rhonda, will you please add Alpha Spec – Pu-239 and U-235 to the following WO#s:

[160-39748 \(samples -01, -11, -21\)](#)

[160-39749 \(sample -01\)](#)

[160-39827 \(Sample -01, -11, -21\)](#)

[160-39828 \(sample -01\)](#)

[160-40004 \(Sample -01, -11, -21\)](#)

[160-40005 \(Sample -01\)](#)

[160-40006 \(Sample -01, -11, -21\)](#)

Let me know if you have any questions.

Rose Condit
Project Chemist
O 925 288 2151
M 925 890 5373

E rose.condit@aplim.com



* WARNING - EXTERNAL: This email originated from outside of Eurofins TestAmerica. Do not click any links or open any attachments unless you trust the sender and know that the content is safe!